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## Original Communications.

### ART. LVI.—ON CONIUM MACULATUM.

By R. EGLESFELD GRIFFITH, M. D.

*Nat. Ord.* UMBELLIFERÆ.    *Sub. Ord.* Campylospermæ.

*Sex. Syst.* PENTANDRIA DIGYNIA.

CONIUM. *Calyx* with the margin obsolete. *Petals* obcordate, somewhat emarginate, very short and inflexed. *Fruit* ovate, laterally compressed. *Carpels* with five prominent, equal, undulate ribs; the lateral ribs margined. *Involucra* 3—5 leaved, partial one dimidiate. *Flowers* white, all fertile.—*Beck.*

*C. maculatum.* *Stem* erect, branched, smooth and spotted. *Leaves* large, tripinnate; leaflets lanceolate, pinnatifid, ultimate segments lanceolate, mostly entire; general and partial umbels many rayed; general involucre of several short lanceolate leaves; partial one few leaved, setaceous, directed to one side.—*Beck.*

*Synon.* *Cicuta maculata.* Gærtner.

*C. major.* Lamarek.

*Coriandrum maculatum.* Roth.

*Conium maculatum.* Lin. Sp. Pl. Willd. Sp. Pl. Nuttall, Beck, &c. &c.

*Icon.* Jacq. Austr. 156. Flore Med. 3. fig. 120. Bigelow. Am. Med. Bot. 1. fig. 11. Orfila. Med. Leg. t. 10. English Botany t. 4191.

*Common names.* Hemlock. Poison Parsley. Spotted Parsley.

*Pharm.* Conium maculatum. U. S.

*Officinal.* The leaves.

*Description.* Root biennial, fusiform, white. Stem herbaceous, from two to four feet high, smooth, cylindrical, somewhat striate, hollow, marked with oblong livid or purplish

spots. Leaves alternate, large, smooth, sometimes spotted, tripinnate, the leaflets lanceolate, deeply dentate, the lower ones pinnatifid and almost pinnate. Flowers white, small, disposed in terminal umbels, composed of about ten or twelve umbellules on long peduncles. Involucrum of ten or twelve lanceolate, reflected, acute leaflets. Involucels of three or four ovate, acute leaflets, situated on one side. Calyx without apparent teeth. Petals five, nearly equal, obcordate. Stamina five, about as long as the petals. Styles two. Fruit oval, didymous, presenting on each of its divisions five salient, crenate ribs, so that they appear to be covered with minute tubercles.

Nuttall mentions a variety *crispatum*, with crisp leaves, whose ultimate segments are subsetaceously acuminate.

*Habitat.* The hemlock is a native of Europe, but is now naturalized in most parts of the United States: generally found in old fields, near roads, on the banks of rivers, &c. It is very common in some localities, whilst in others it is rarely to be met with; thus in the neighbourhood of Philadelphia it seldom occurs.

*Botanical History.* Hemlock was very early recognized as a remedial agent of great power, and is highly recommended in the works of Hippocrates and Galen. Pliny also speaks of it as an antidote to the intoxicating effects of wine. The great use, however, made of it by the ancient Greeks, was as a poison for persons condemned to death for violation of the laws. This powerful article, like many others, fell into entire neglect, and does not appear to have been again employed until the experiments and eulogies of Stoerck, attracted the attention of the profession to it, when it came into general use, and was considered by many practitioners as one of the most valuable additions that had been made to the materia medica; a more extended trial has not realized the extravagant eulogies bestowed upon it, and as is generally the case, when a reaction of public opinion takes place, it is not now perhaps, valued according to its real merits.

*Medical properties and uses.* All parts of the hemlock exhale a disagreeable and fœtid odour, which has been com-

pared to that of the urine of cats, and which is capable of inducing narcotic effects if respired for any length of time. This smell is most perceptible in the entire plant, and what is still more remarkable, it is stronger in the dried than in the fresh state. The taste of the leaves is nauseous and somewhat bitter. It is stated that climate has a great influence in the development of the narcotic and other properties of this plant; an increased temperature occasioning a proportionate increase in the powers and virulence of the vegetable. Thus Mr. Colebrooke states that the extract made from English hemlock has scarcely any action on the system. In fact, whilst in the southern parts of Europe, the hemlock is possessed of the most energetic qualities and is a virulent poison, in England, Germany, and other northern countries, it decreases so much in power that, it is said, the leaves and root may be eaten with impunity.

Hemlock acts on the human system as a narcotic. When administered in a full dose, it occasions vertigo, dimness of sight, nausea, and great debility; when pushed further, these symptoms are greatly increased, and delirium or coma, paralysis, convulsions, and even death, ensue; when it operates as a poison, the respiratory function appears to be chiefly affected, and the countenance becomes engorged with blood, as in cases of strangulation.

Hemlock was used by Stoerck in the treatment of cancer and scirrhus, but a subsequent experience has not shown that it possesses any controlling powers over these diseases, though it is undoubtedly useful as a palliative. No medicine is more subject to variation in its effects on patients than this, its mode of operation depending much on the idiosyncrasy of the individual to whom it is administered. To prove useful as a narcotic, it must be given in gradually increased doses, till its poisonous effects begin to manifest themselves, as it has been fully proved that wherever it has proved useful the cure proceeded in a direct ratio to its sensible effect on the constitution.

The efficacy of no remedy depends more on the proper preparation of it than the present. The leaves should be

quickly dried in the shade, as they are deteriorated by the action of light; when fully dried they must be kept in small and carefully closed bottles, in a dark place.

*Pharmaceutical preparations and mode of administration.*—

The only officinal preparation recognized by the United States' Pharmacopœia is the extract, which is directed to be made by evaporating the expressed juice to a proper consistence. Dr. A. T. Thompson says, in speaking of this preparation, that it is made in two manners: the expressed juice is evaporated to the consistence of syrup, and the powder then added to bring it to a proper degree of thickness for making pills; or the green feculent part of the expressed juice is separated by the filter, and added to the other part after it has been slowly evaporated, and clarified over a gentle fire. It should always be borne in mind that few extracts are so readily injured by want of care in the preparation as that of hemlock, a slight alteration of temperature destroying all its efficacy. It should also be noticed that the extract is preserved with great difficulty, as it is liable, without the greatest care being used, to become moist, when a saline efflorescence will appear on it, after which it is comparatively inert.

Dr. Thompson also states that the best form of preparation is the tincture, which may be given in any vehicle except one of an acid nature, which destroys its narcotic power. The expressed juice has also been recommended in Germany, in small doses, and as an external anodyne application, a cataplasm made with the fresh leaves bruised, has been found beneficial in many cases of local pain and irritated ulcers.

The dose of the extract is three or four grains twice a day, to be gradually increased till the narcotic effects begin to be developed; when its administration is persisted in for any great length of time, the system becomes so habituated to it, that the quantity required to produce the desired result is very great. The dose of the tincture is from ten to thirty minims.

*Analysis.* No complete analysis of this plant has been made though many investigations as to its general constituents have been recorded. Schröder has given the following as the re-



sult of his experiments on the fresh leaves; in 100 parts he found Resin 0.15, Extractive 2.73, Gum 3.62, Albumen 0.31, Gum fecula 0.18, Heterogeneous mass 92.4. This was a compound of acetic acid, sulphate, hydrochlorate and nitrate of potassa, malate and phosphate of lime, with the phosphates of iron, magnesia and manganese.

Brandes obtained an alkaline principle, to which he gave the name of *Cicutin* or *Conin*, by the following process. The fresh plant was digested in alcohol for several days, the tincture filtered and evaporated, the residue treated with water, magnesia added, and the whole evaporated to dryness; the residue treated with a mixture of alcohol and ether, when the conin was obtained from the filtered solution on evaporation. This principle acts on the system in very small doses, half a grain producing vertigo and great pain in the head.

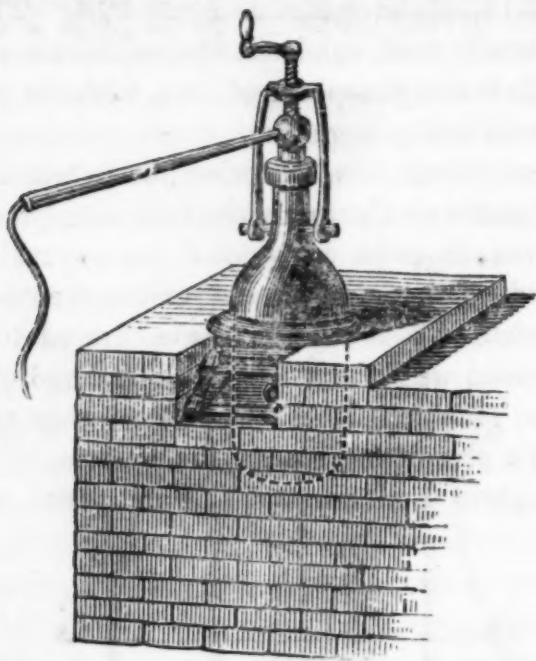
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#### ART. LVII.—APPARATUS FOR OBTAINING OXYGEN UPON A LARGE SCALE.

By ROBERT HARE, M. D., Professor of Chemistry in the University of Pa.

SINCE nearly as much time and trouble are expended in conducting a chemical process on a small scale as upon a large one, and since in my experiments, I consume large quantities of oxygen gas, I have lately employed the cast iron alembic represented in the figure, for the purpose of obtaining the gas from about twelve pounds of nitre. When in operation, it is made to occupy a suitable cavity in a furnace, built in a stack of brick work. The neck is so formed as to receive a large hollow knob of iron, from which a gun barrel proceeds at right angles. This knob is secured by a gallows screw, embracing the arms cast with the alembic. The juncture is to be luted with clay, added dry to a saturated aqueous solution of borax. To the orifice of the gun

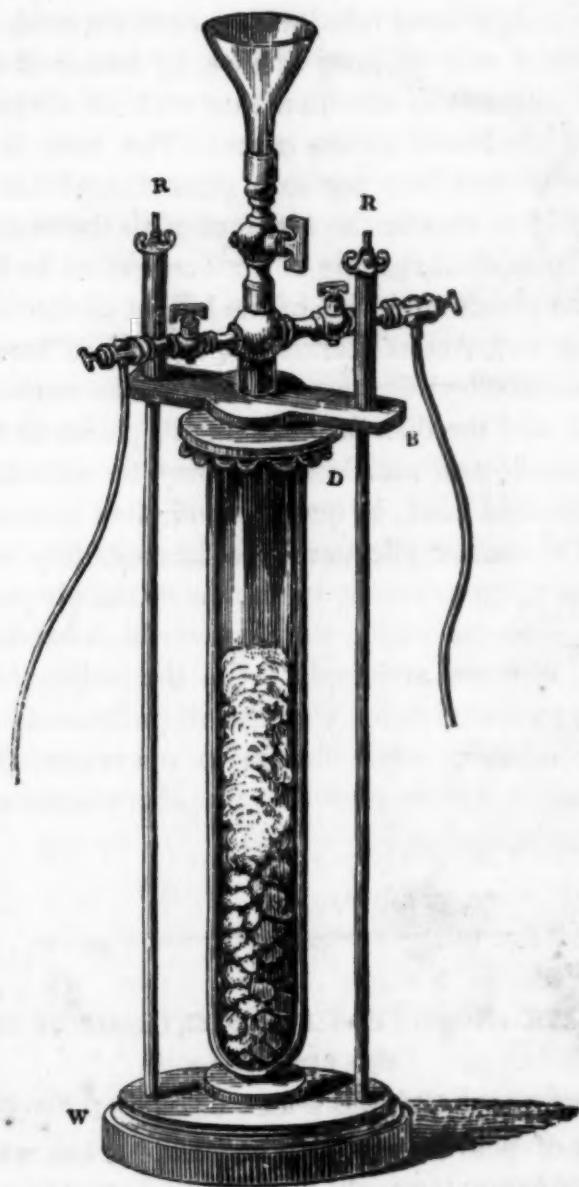
barrel, a flexible leaden pipe is attached, by which the gas is conveyed to the gasholders or gasometer.



Care is taken to use no more fire than will bring over the gas, and the operation is arrested as soon as the impurity exceeds 20 per cent. By attending to these precautions, the gas is of a better quality—the first portion being nearly pure, and the alembic is less corroded. Besides, the *nitrate* being converted into *nitrite* of potash, by deflagration with charcoal, produces a tolerably pure carbonate of potash. As the equivalent of nitre, or nitrate of potash, is 102, and that of oxygen 8; 12 lbs. of the salt ought to give nearly 1-12th, or 1 lb. of oxygen, by yielding only one atom. One pound, or 7,000 grains of oxygen, divided by 33, the weight of 160 cubic inches of oxygen, gives 21,200 cubic inches to the pound of oxygen, or about  $12\frac{1}{2}$  cubic feet, equal to 90 gallons.

It follows, that if, as Berzelius alleges, the nitrate is converted into a hyponitrite, we should get about 180 gallons of oxygen. It is best to keep the first portions of the gas obtained, separate from that which comes over subsequently.

ART. LVIII.—APPARATUS FOR SHOWING THE INFLUENCE OF PRESSURE ON EFFERVESCENCE. By the author of the preceding article.



A CYLINDRICAL receiver, about 30 inches in height, is supported on a wooden pedestal, between upright iron rods fastened into the pedestal, and at top cut into screws furnished with nuts. By means of these screws and nuts, and an in-

tervening cross bar, a disk of lead, alloyed with tin to harden it, is pressed upon the rim of the receiver. The disk is so fitted to the rim of the glass, as to make with it an air tight juncture. In the middle of the disk there is an aperture, from which proceeds a stout tube, with a cock on each side, severally furnished with gallows screws, by means of which lead pipes may be made to communicate with an air pump on one side, and a condenser on the other. The tube is also surmounted by a cock into which a glass funnel has been cemented. Before closing the receiver with the disk, some carbonate of lime, or carbonate of ammonia must be introduced, so as to rise about one-third of the height of the receiver. I have found calcareous stalactites, like those from Weyer's cave, to be excellent for this purpose. The carbonate being introduced, and the disk fastened into its place, as represented in the figure, diluted muriatic acid may be added, by means of the funnel and cock, in quantity sufficient to cover the carbonate. Of course effervescence immediately ensues. If, under these circumstances, by means of the air pump, the atmospheric pressure within the receiver be lessened, the effervescence increases strikingly. On the other hand, if by closing the communication with the air pump, and opening that with the condenser, while this is in operation, the pressure be increased, it will be seen that the effervescence is proportionably diminished.

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ART. LIX.—NOTE UPON FLUID EXTRACT OF SENNA.

By CHARLES ELLIS.

(Read before the Philadelphia College of Pharmacy, Nov. 25, 1834.)

A CLASS of pharmaceutical preparations has within a few years past been extensively introduced into use in England, and to a limited extent in this country, under the name of Concentrated Essences, or Fluid Extracts.

This concentration of the virtues of vegetable substances, in a convenient form for use and for preservation, is certainly



entitled to more consideration than it has yet obtained in our pharmaceutical and medical communities. The compound fluid extract of sarsaparilla, (although others have been introduced,) is almost the only preparation of the kind which has been generally and extensively employed. When properly prepared, and the properties of the sarsaparilla not injured by heat, it is certainly a very efficacious and convenient article, both for forming extemporaneously the Lisbon diet drink and the concentrated syrup of sarsaparilla.

Reasoning from analogy, there are yet very many medicinal plants in the vegetable kingdom which may with great advantage be subjected to the same ordeal.

The preparation which has claimed my attention, and which will form the subject of this notice, is the concentrated essence of senna.

To obtain the cathartic properties of this plant, uninjured, in a convenient form for immediate exhibition, must be desirable to the physician, as he may often wish to prescribe it either alone or combined with some other purgative, without being subjected to the loss of time attendant upon making the infusion, or the uncertainty of its being properly prepared.

I need not dwell upon the advantages which every concentrated preparation of the kind will possess in extemporaneous pharmacy, where the plant itself is extensively used, and where such concentration can be effected without any injury to its medicinal properties.

The following is the formula I have adopted, which produces a fluid extract corresponding in all its sensible properties, and I have no doubt will be found so in its remedial qualities with the English essence of senna, used for the preparation of the infusion.

Take of Senna,	lbj.
Alcohol,	Oiv.
Aq. Bullient,	Oviiij.
Sacchar. Purif.	$\bar{z}$ x.
Ol. Fœniculi,	gt. iv.

Pour the boiling water upon the senna in a covered vessel, and set aside until it is cold; then add the alcohol and mace-

rate for twelve days; strain it off with pressure, decant and filter, and distil off the alcohol; evaporate over a water bath to 12 fluid ounces, to which add the 10 ounces purified sugar, and dissolve with gentle heat. When cold, add the 4 drops of Ol. Fœniculi.

The English extract in my possession contains no essential oil, and it would probably be better to omit it in this, as it can be readily added when desired.

The above quantities will furnish f $\bar{z}$ 18 of extract, containing the active properties of the given quantity of senna. f.  $\bar{z}$ iss. of this extract will represent the strength of  $\bar{z}$ i. of senna, consequently f.  $\bar{z}$ iss. added to a pint of water, will form the infusion of the United States Pharmacopœia or f.  $\bar{z}$ iiij. to  $\bar{z}$ iv. of water, the dose for an adult.

The strength of this fluid extract is made to correspond with the English preparation; of the latter, however, f.  $\bar{z}$ ij. are directed to form a pint of infusion of senna, but it must be observed that the formula of the London requires a larger proportion of senna for the infusion than that of our national pharmacopœia.

#### ART. LVIII.—ON THE ERYTHRÆA CHILENSIS.

By J. CARSON, M. D.

*ERYTHRÆA chilensis*, Persoon.—From Steudel, "Nomenclator Botanicus," are obtained the following synonymes:—*ERYTHRÆA chachanlahuen*, Roemer and Shultes; *GENTIANA chachanlahuen*, Molina; *GENTIANA Peruviana*, Lamarck; *CHIRONIA chilensis*, Willd. sp. pl.

Sex. Syst., Pentandria Monogynia, *Nat. Ord.* GENTIANÆ.

This plant belongs to the genus *Erythræa*, of Richard. The generic characteristics are the following:—Calix appressed, subpentagonal, five-toothed; corolla infundibuliform, tube long; anthers after fecundation becoming spiral; stigmas two, approximated, rarely simple; capsule elongated, one-celled, two-valved; seeds not marginated.

According to Persoon, it differs from *Chironia* in having a one-celled capsule; that genus being characterized by its four-celled pericarp, as also by its declinate pistil, but approaches nearer to *Gentiana*, from which, however, it is distinguished by the spiral anthers, distinct style, and approximated stigmas.

The species under consideration is nearly allied to *E. centaureum*, of Europe,\* known by the name of lesser centaury, and appears to possess the properties peculiar to it. The *E. chilensis*, nevertheless, is distinguishable by its lanceolate, one-nerved leaves, of which the radical ones are not accumulated in tufts; by the arrangement of the flowers, which are pedunculate, not produced in bundles or corymbiform bunches on the summit of the plant; by the absence of the scaly appendages at their base; and finally by its shorter style. The height, moreover to which it attains, is not so great, and the general aspect is more delicate.

The root, which is branched, fibrous, yellowish white, and of moderate size, gives rise to a straight stem, ten or twelve inches high, appearing woody at its base. Above, as it ascends, it becomes branched, and finally, at its summit, very dichotomous. The branches and stem are slightly angular, in which particular, there is an agreement with several species of different genera belonging to the same family, and more especially some of our native plants, as *SABBATIA angularis*, *GENTIANA amarelloides* &c. The leaves are opposite, sessile, oval-lanceolate, green, smooth, and traversed by a single nerve.† The flowers are pedunculate, solitary at the summit of the branches, and in their axils, of a beautiful rose colour. The calix is divided into five, acute, straight segments; corolla infundibuliform, limb five-cleft, lobes obtuse; capsule one-celled, bi-valved.

The impression made upon the organs of taste, when chewed, is that of a mild bitter, perhaps a little more potent

\* Found in the state of New York; *Beck*; probably introduced.

† According to *Lamarck*; although in the specimens which I have examined, the rudiments of lateral nerves were distinguishable, perhaps not sufficiently so to destroy the diagnostic character noted by that botanist.

than its congener *E. centaurium*. From the character and properties of the plant, we would be led to conclude that its medical uses and value are nearly allied to those of the other individuals of the natural tribe to which it is referred; and this, upon examination, together with the testimony presented with regard to its efficacy, will be found to be correct, although it is most likely that upon fair comparative trial there will be discovered virtues in it which are not to be detected in these. As a decided, but not unpleasant bitter, improving the appetite, and increasing the tone of the stomach, it will prove a valuable article of the materia medica, and as such has been for a long time in use throughout the country of which it is a native.

The herb is an annual, indigenous to Chili and Peru, growing abundantly on the arid plains of the lowlands, and in the pastures on the side of the hills. With respect to locality and habitat, there is no deviation from the known fact, that this class are generally natives of the temperate and higher latitudes, being less affected by cold than extreme heat. Whether it would bear transplanting to our own climate, is an experiment worth the trial. Great efficacy is attributed to it by the natives as a purifier of the blood, as also a remedy in pleurisy; hence, the common name by which it is called, is expressive of this property. As an aperient and sudorific, but more especially a tonic in the cure of intermittent fever, its powers are much vaunted. Thus Feuillé, in his "Voyage to Chili," assures us that he has experienced its beneficial influence upon himself, and M. Lesson corroborates the statement. M. Molina, who visited Chili the latter part of the last century, corrects a mistake which was announced in 1707, as to its being a native of Panama. He asserts that it is solely located in the countries we have mentioned, and gives as the true Chilian name, "Cachan la hten." Several other diseases are also cited, as yielding to its administration, as jaundice, worms, rheumatism and sore throat. The utility in these various disorders must necessarily depend upon the condition of the system and the mode of exhibition. Thus, after the excitement incident to inflammatory affections has



been subdued, it may prove useful as a deobstruent and gentle tonic; and the sudorific or stomachic effect will depend upon the temperature and quantity of the preparation administered.

The form of exhibition most convenient, is either a decoction or infusion made from the whole plant, and administered in larger or smaller doses, according to the circumstances of the case. For the introduction of this article, we are indebted to Dr. Ruschenberger, of the United States' navy, to whose kindness I have been indebted for the following note: "The *ERYTHRÆA chilensis* has been used by him during a period of nearly two years on board ship, in the form of infusion, the proportion being  $\bar{z}$ j. to the pint of water. Dose, a wine glassful three or four times daily. He found it useful in all cases where mild tonics were indicated, and particularly so, when cinchona, quinine and gentian would not remain upon the stomach. In one case, complicated with gastric irritation, it was most serviceable. The Indians in Peru use the plant as spring physic."\*

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For the Philadelphia Journal of Pharmacy.

ART. LIX.—PHARMACEUTICAL ESSAYS.—No. 1.

I HAVE watched the progress of the Journal of Pharmacy with much interest, and being desirous to contribute something to its pages, have thought that a few essays on the practical part of our profession, would probably be a more valuable contribution than any thing more ambitious.

They will not, it is true, add to the fame of the Journal; they will not be copied into other periodicals, nor will abstracts or translations be republished abroad. My object will be answered, if they do good at home, if they attract the attention of an intelligent apprentice, or if they even

\* This medicine can be obtained at Mr. F. R. Smith's Drug Store, S. W. corner of Walnut and Eighth streets.

excite care and awaken an ambition to excel in a village seller and compounder of drugs.

Perhaps there is no business in which *character* is so essential to success as ours; nor any in which that success,—certain in the end to be the reward of skill, and patience and integrity,—is so slowly reached.

It is a great mistake in a young man to suppose that he can open a shop, and by the glitter of newly gilt bottles and drawers, a costly counter and handsome shop windows, step at once into a good business. He must not be disappointed if years pass over his head with but a small increase of a business, scarcely more than sufficient to meet his personal or family expenses. In these respects, our business resembles the practice of law and medicine, in which some of the most eminent practitioners have arrived at the honours of their profession, after a long and painful probation. Pretenders and quacks,—mere shopmen, will always outstrip the modest and industrious man of science in the career of popular favour. But let the latter not be disheartened; if he keeps steadily in view the integrity which is the ornament, and I would add the characteristic of our profession, he will infallibly succeed in the end. He will moreover, by being thus trained in the “*res angusta domi*,” acquire habits of frugality, of method and simplicity of living, that will be more valuable than wealth, as they furnish all the means of enjoyment that riches can bestow, on a broader and less perilous eminence. An exposition of the moral influences upon the community, of small and regular accretions of wealth, as contrasted with the sudden overflow, would be a valuable addition to ethical science, and throw great light upon the causes of the national character of whole nations in Europe.

The first consideration which claims our attention is, what are requisites for a good apothecary?

In selecting an apprentice, I would take as my first choice a lad of quick apprehension, of sobriety above his years; kind and civil in his disposition; polite in his manners; not over talkative, and settled and studious, yet active and industrious in his habits. His qualifications must be, in addi-

tion, a competent knowledge of accompts; the writing of a neat, legible, uniform hand; enough Latin, French and German to be at no loss in translating and construing; a turn for Natural History; some knowledge of Botany and Chemistry, and a considerable share of mechanical ingenuity and manual dexterity. If a lad possessing all these qualifications passes his apprenticeship in a shop conducted on just principles, and which enjoys a large patronage, he can scarcely fail to become distinguished in his profession; and the want of any one of them will detract from his usefulness. Of all the faults in an apprentice, carelessness is the most dangerous, and the most incurable. One or two mistakes, even of a somewhat serious nature, may be overlooked and placed to the account of accident and our common imperfections; but a repetition of offences of carelessness should always be followed by dismissal from the business, nor should any false and misplaced lenity induce a conscientious master to overlook them. The youth had better seek his fortune elsewhere, than in an apothecary's shop, where his thoughtlessness may endanger life, and bring misery and distress upon whole families.

There is another requisite which I have not mentioned that ought not to be omitted; and that is personal neatness and cleanliness. I would as readily forgive my cook for being a sloven as my apprentice. What can be more disgusting than dirty hands at work at a potion that is to be administered to a patient of delicate stomach, rendered doubly so by debility or inflammation? I shall have much to say on this subject but it is so much of a habit, that if an apprentice does not bring it with him to the shop, he will not acquire it; and it must therefore be ranked among the preliminary qualifications. Having thus introduced myself to the readers of the Journal by this desultory preface, I must defer the commencement of my regular design to the next number. The essays will consist of plain and minute,—some may think them trivial directions,—for the manual operations of the shop. And no one who is aware what slight difficulties will often arrest us in an untried course, will despise these minute directions.

The genius of Faraday himself has not made a more acceptable present to the chemical science, than his treatise on manipulations.

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ART. LXII.—PHARMACEUTICAL NOTICES. No. 10.

*James' Powder.*—We are indebted to Dr. J. R. Coxe, for the following extract of a letter from Dr. Robert E. Robinson of Petersburg, Virginia, respecting this celebrated article of the materia medica. The possession of this recipe, however authentic it may be, will not at the same time obviate the difficulty, as under the name of calx of antimony, either the peroxide or the protoxide may be used, thus leaving the composition and properties of these powders as uncertain as before.

"I take the liberty of enclosing you a copy of Dr. James' formula for making his celebrated powder. Of its correctness there can be no doubt; it was given to my father by Dr. Reynolds, who was a fellow student with and received it from a son of Dr. James. It has subsequently been compared with the formula of Mr. Adams, who frequently prepared the powder in London, for Dr. James, and it corresponds exactly with his. It was written by Dr. James in the following manner:

R. Antimon. Tatarizat. ℥i.

C. C. C.

C. Antimon. aa ℥v. M.

Ft. pulv. in chartul. continent. singul. gr. xxi. dividendo.

The second article is, Corn. cerv. calcinat., and the C. antimon. is the oxide (calx) of antimony.

The genuine powder is always put up in papers containing nearly xxi. grains."

*Extract of Rhatany.* This preparation, when properly made, is by far the neatest and most efficacious form for exhibiting this drug. It, however, often disappoints the prac-



tioner from the adulteration to which it is subjected when not prepared by the apothecary himself. These adulterations are various, the most common, however, is fortunately the least objectionable, namely, with kino, as this latter possesses most of the properties of the rhatany. At the same time, as it differs in some respects in its remedial qualities, and as all sophistications, even the most innocent, should be discountenanced by the pharmacist, the following method, proposed by M. Guibourt, of detecting this admixture may prove useful. If an ounce of boiling water be poured on ten grains of extract of rhatany, in about two hours the solution will become opaque and milky. Kino, treated in the same manner, gives a clear solution. The solution of extract of rhatany, treated with acetate of lead and diluted with water, gives a reddish precipitate, whilst that of kino affords an ash gray deposit. The solution of extract of rhatany treated with tartar emetic, does not become turbid or afford a precipitate for some time, whilst that of kino instantly gives a whitish yellow one; hence if a precipitate immediately takes place on treating a cold solution of extract of rhatany with this test, it has been adulterated with kino.

*Tartrate of iron and potash.* The process for preparing this salt with metallic iron and cream of tartar, which gives a better product than that prescribed by the United States Pharmacopœia, has the disadvantage of being very tedious; this may, however, be obviated in a great measure, by placing a few pieces of clean copper in the vessel, thus rendering the iron electro-positive, in which state the acid salt acts on it more rapidly; no fear need be entertained of an admixture of copper, as this metal is not affected as long as any of the iron remains undissolved.

*Unguentum Plumbi subacetatis.* Mr. Sprague recommends the following as a neat and valuable preparation of lead, rendering every other form, and especially the *ceratum plumbi subacetatis*, quite superfluous.

R. Emplast Plumbi	3vj.
Liquor Plumbi subacetatis	f. 3iss.
Olei Olivæ	f. 3ij.
Adipis	3vj.

Liqua simul emplastrum et adipem, dein sensim adde liquorum et oleum ut fiat unguentum.

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ART. LXIII.—MEDICO-BOTANICAL NOTICES. No. 5.

*Robinia pseudo-acacia.* This well known native tree does not appear to have received that degree of attention to which it is justly entitled, for although highly esteemed for the valuable properties of its wood, which from its durability, is extensively used for tree nails in ship building, and posts for fences and other enclosures; this is commonly considered to be the extent of its usefulness; this, however, is far from being the case, as almost every portion of it is endowed with some useful property.

The leaves, when prepared in the same manner as indigo, may be advantageously used as a substitute for that article; they afford an excellent nourishment for horses and cattle, either in a fresh or dry state. The flowers, which are very odoriferous, are said to possess antispasmodic properties, and furnish the basis of a very agreeable syrup, according to BONAFIOUS, (*Ann. Hort.* ix. 168,) an excellent liqueur has also been prepared from them. It has been asserted by GROSIER, (*Descrip. de la Chine* i, 507,) that they are used by the Chinese to produce that beautiful yellow so remarkable in their silks &c., by the following process: half a pound of them are gathered before they are fully blown, and roasted over a clear and gentle fire, in a clean copper pan, continually stirring them briskly; when they begin to turn yellow a little water is poured on them, and boiled till it acquires a deep colour; it is then strained, and half an ounce of alum and one ounce of finely pulverized shell lime added, when the dye is fit for use. We have given these directions, in hopes that some of our

readers may be induced to make the experiment, though we think that there may be some mistake with regard to the plant, as it appears strange that a perfectly white flower like that in question should furnish so rich and permanent a yellow dye. Merat and De Lens, (*Dict. Univer. Mat. Med.* vi. 101,) also state that these flowers furnish a palatable dish on being fried.

The seeds, which are furnished in considerable quantities, are somewhat acrid, but by infusion in water, they lose this quality and furnish an excellent farina. In their natural state they are eagerly eaten by poultry, and on expression yield a large proportion of limpid oil.

The bark is susceptible of being spun, and forms a strong fabric; the inner portion is sweet, somewhat resembling liquorice in taste, but is emetic and cathartic in large doses; that of the root is the most powerful. Dr. Gendron, (*Ann. Clin. de Mont.* xxiv. 68,) relates a case of some schoolboys who had incautiously chewed this bark, and swallowed the juice, and in about three hours afterwards presented the symptoms of the ingestion of an acro-narcotic poison, as vomiting, lethargy, and slight convulsions. There is a variety cultivated in gardens which is small and has yellowish flowers, which may perhaps be the plant from which the dye is obtained.

*Spilanthus oleracea.* This plant, which is a native of South America, has of late years attained some celebrity on account of its antiscorbutic and odontalgic qualities. Being an annual of very rapid growth, it succeeds very well in our climate, and in fact, when once planted, it is with difficulty eradicated, its seeds being scattered in all directions. The whole plant has an excessively acrid, aromatic taste, somewhat resembling that of peppermint, but much more powerful. It has been much used in France as an antiscorbutic, and if we may judge from the eulogies bestowed upon it, may be considered as one of the most powerful we possess. From the analysis of M. Laissaigne, it appears to consist of, 1, a very acrid, odorous, volatile oil; 2, a gummy matter; 3, extractive;

4, acid malate of potash; 5, wax; 6, a yellow colouring principle; 7, different salts. The best preparation, when used as an odontalgic, is the alcoholic tincture made from the flowers; this acts like other stimulants, by creating a counter irritation, and a copious flow of saliva. As a tooth wash, the diluted tincture is perhaps preferable to any we have in use, especially when the gums are spongy and in bad condition.

Besides these properties it is said to possess others, which, however, have not been sufficiently confirmed; thus Poupée Desportes speaks of it as a hydragogue, and Descourtilz states that it will operate as a vermifuge. It certainly deserves an extended trial, and we would draw the attention of our readers to it.

*Sagittaria sagittifolia.* This beautiful aquatic plant, which grows in abundance in all our rivers and wet meadows, is deserving of attention. The roots furnish farinaceous bulbs, which are usually found in the clay soil below the stratum of mud by which the plant is surrounded. They are sometimes several inches in diameter, and are assiduously cultivated in China and Japan, where they furnish no inconsiderable part of the food of the inhabitants. Even in the raw state, they afford a wholesome article of diet, and when properly prepared furnish a white and light fecula resembling the best arrow root. These roots were extensively used by our Indians, and are still employed among the western tribes.

*Matico.* Under this name Dr. Ruschenberger, United States Navy, lately presented to the Academy of Natural Sciences, the leaves of a plant which are highly esteemed in Peru, as a styptic. They are alternate, cordate, long, reticulated, and pubescent beneath; on pulverizing them they have an aromatic odour, somewhat resembling that of mint; on chewing them, they at first appear to be insipid, but in a short time their taste becomes very acrid, not unlike that of the *Lobelia inflata*, though more aromatic. Their cold infusion is yellowish, and does not appear to be possessed of



any very sensible properties. Dr. Ruschenberger states that they are considered so infallible a remedy for staunching blood, that the Peruvians never went into a campaign without carrying a bundle of it with them. Mr. Frost, who brought this plant before the notice of the Medico-Botanical Society of London, observes that it was likely the matico was a species of Piper. This seems probable from the appearance of the fragments of stems in the parcel sent by Dr. Ruschenberger. When they are to be used, they are coarsely pulverized, and thus bound over the wounds.

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ART. LXIV.—ON CERTAIN CHEMICALS OF COMMON USE IN  
THE SHOPS. By C. ADAMSON.

(Read before the New York College of Pharmacy, March 6, 1834.)

CIRCUMSTANCES frequently occur in the common business of the shops, which lead to investigations of importance. We frequently receive articles from various sources which pass currently as good, because they appear so to the eye, and we rest satisfied with that imperfect examination, until some accident happens which develops their real character, showing that we have been imposed upon, or that the manufacturer, from carelessness, has been deceived himself. I would, therefore, advise that every chemical article should be examined critically before it is used in the shop. A very simple analysis will generally suffice to determine its character if genuine; and this may be extended to minuteness, if results are discovered which lead to doubts of its purity. I am led to make these remarks from the following circumstance:—A manufacturing chemist inquired of me, about two months ago, what preparations of zinc were likely to sell. I mentioned crystallized sulphate, acetate and white oxide, giving him an order for the latter, telling him that what we had been using for some time back I did not like so well as parcels we formerly had from England. In a few days he returned, informing me that he could not make oxide of zinc white enough

for sale. He showed me three different samples, which were made from various specimens of the zinc of commerce, but all of them afforded an oxide of a pale flesh colour, varying but little from each other, and he wished to see a sample of ours to examine and compare. He mentioned the circumstance of Strommeyer finding in Hanover that all the apothecary shops were supplied with carbonate of zinc, instead of oxide, (which fact was also communicated to me by Professor Rogers,) and expressed his opinion that our parcel was also carbonate for the same reason. This was found to be the case; for upon examination, 82 grains of it lost 26 during its solution in half an ounce of dilute sulphuric acid, which was attended with great effervescence.

I then obtained from different stores in this city seven samples of the article the greater portion of which were distinctly known to have been manufactured in Philadelphia, and they all lost from 24 to 27 grains in 82, by submitting them to the same operation. Two of these samples afforded turbid solutions, which, on repose, deposited a grayish sediment resembling the impure oxide of zinc, commonly called tatty powder. The loss of weight was in all these instances greater than that of the carbonic acid, which I imagine arose from the violence of the effervescence which elevated some of the lighter particles of the carbonate of its stream. The eighth sample, and the only one I could procure, proved to be oxide of zinc; it lost a few grains during its solution, which might have been carried off by the action produced by the acid on two or three small pieces of metallic zinc, which were mixed with it. The pale orange colour of the samples of oxide before mentioned, appears to depend upon a portion of cadmium, which is united to the zinc in its natural state, and as the carbonate of this metal is perfectly white, its presence is not to be observed in the preparation at present in use in this city.

Whether the medical qualities of this metal differ from those of zinc, I am not able to say; but it is evident, that as the carbonate of zinc contains nearly 27 per cent. of acid, besides 24 proportionals of water, the activity of any com-

position which may be made from it when the prescriber expects to have the oxide, must be only half the strength intended.

I also wish to call the attention of the members of the college to an article, no doubt imported from France, and sold by Messrs. Carnes. I have had two parcels within three or four years. It is sold as the hydriodate of potash, but it contains at least fifteen per cent. of a very difficultly soluble salt, which, from its having in some of the phials a lemon colour, I at first took for iodate of potass, but the strong acids did not decompose it, as would have been the case had it contained iodine. Five grains separated from a solution by the filter, were not perceptibly diminished in  $\text{zij}$ . of cold distilled water; on the application of heat to ebullition, it dissolved, and formed, on cooling, longer crystals than the granular form it was in before solution; its more easy solubility in hot water than cold, proved it was not sulphate of lime, which it much resembles. I am inclined to think, from a cursory analysis, that this difficultly soluble salt is a chloride of potassium, combined with a very small portion of some metallic salt, and probably arising from the vessel in which it was made.

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ART. LXV.—REPORT OF COMMITTEE OF INSPECTION ON A  
CASE OF POISONING BY OIL OF WINTER GREEN.

(Read before the New York College of Pharmacy, June 1, 1832.)

Your committee of inspection, to whom was referred the investigation of the properties of oil of wintergreen, in relation to the cases of poisoning by it in the Sixth Avenue in the city, respectfully report:—That they obtained a copy of the verdict of the coroner's jury, setting forth the fact of its exhibition, and the consequences thereof; also, copies of the affidavit of Isaac Hammond, by whom the mistake was committed, of Levi Van Kluck, the owner of the shop, and of Oliver Holmes, a neighbour and acquaintance of Van Kluck. That they

went to the shop of the soi-disant doctor Van Kluck, in the Sixth Avenue, whom they saw and conversed with on the subject, that he produced the bottle whence the fatal potions had been taken, the contents of which appeared to your committee to be oil of wintergreen of rather thinner consistence than is generally met with, purchased, as represented by said Van Kluck, of J. C. Morrison in Greenwich street, and stronger than usually sold; but to two of your committee who tasted it, it did not appear to differ materially from other parcels of that oil. The quantity taken by each of the persons who died, he endeavoured to show, by pouring into a tumbler glass what he said was a similar quantity, appearing to be somewhat more than a fluid ounce. He insisted that there was not any deleterious principle in the said oil. Remarking, also, that he had sold many gallons of the compound, (which in the above instances, was intended to have been given, strongly flavoured with the oil in question,) and that he had never known any untoward symptoms to have been produced; he also mentioned several instances of the frequent use of the herb, which accorded with facts within the knowledge of one of your committee; he showed to the inquirers samples of his medicine, and of his spring beer, the former of which tasted strongly of wintergreen; and although by him called "bit-  
ters," of very little besides it and the spirit of which it was composed.

Oliver Holmes, who was with a number of other customers in the shop, corroborated these statements, as far as his knowledge extended, informing your committee that he had been benefitted by the above medicine in a state of ill health which he called "dyspepsia;" to which Van Kluck added, that it was a cure for that disease, also for dropsy and gravel, besides several others; and he pursued his subject by repro-  
bating the treatment of the unfortunate persons by the physicians called to their aid, particularly the bloodletting, which he said was carried to a great extent, and of no use. As to him, your committee have only to remark, that they felt surprised that any person, however ignorant, could place confidence in one seemingly possessed of so little intelligence.



Of the oil in question. It is prepared in large quantities in the country, from *GAULTHERIA procumbens*, or winter-green, class Decandria, order Monogynia, of Linnæus, or of the natural order Bicornes, of the same author, and of class 9th, order 51, or *Ericæ* of Jussieu, described as possessing tonic, astringent and refrigerant properties. Its usual colour is deep red, of a rich spicy flavour. Its taste, at first bland and sweetish, becomes quickly acrid on the tongue, and extends its heat quickly to the fauces, even when not swallowed, in some measure like the root of mezereon, but its effect is not so durable. It is in general use among the Indians to the north and east, as a medicine, and is frequently used by new settlers in place of common tea.

From all the circumstances, viz. the various affidavits, leaving no grounds to doubt the fact of this oil having been the cause of the death of the persons in the cases alluded to—the quantity of it taken—the appearance of the stomach after death, which your committee are informed by a member of the faculty who was present at the examination, showed strong marks of general inflammation, and the frequent use of both oil and herb, from which it is produced in a diluted state without any bad consequences ensuing, altogether lead your committee to think that it does not possess in itself any deadly principle, but simply caused the destruction of life in the above instances by the irritation it produced in this delicate tissue, by the quantity and very concentrated form in which it was applied to it.

Your committee beg leave to add, that some further experiments are at present going on, the result of which, if interesting, they will communicate at some future meeting.

## Selected Articles.

### ART. LXVI.—SOME EXPERIMENTAL RESEARCHES TO DETERMINE THE NATURE OF CAPILLARY ATTRACTION.

By JOHN W. DRAPER.

(Continued from page 254.)

THE second and third experiments were made to determine whether, when the surface was wet, a greater or a less weight would be required to separate them. From theoretical considerations, it would appear that the disks ought to adhere more strongly when water intervenes; for the rupture does not take place in consequence of the attractive force of the mercury and glass being overcome, but in consequence of the cohesion of the watery particles being overbalanced; this is evident, as a film of water is to be found on both surfaces; but in the last two cases, the theory would likewise indicate that the numbers determined by the balance were increasing, while those determined by the electrometer should be decreasing; and even in the last case the electrometer ought to be insensible. It may likewise be remarked, as connected with this, that the gum lac adheres less forcibly to mercury than glass, and only increases in adhesion when exposed to the same source of moisture, in proportion as one to three. Yet, when both substances *are wet*, the force of adhesion becomes the same, for then it represents the cohesive power of water. This experiment gives a salutary caution, that in attempting to compare the force of adhesion, with the electricity developed, every part of the apparatus and substances employed, ought to be free from moisture. If the proof plane of Coulomb be used, it will likewise be necessary to have regard to the conducting power of the surface under trial; without this precaution erroneous results would be obtained, arising from unequal distribution over the surface after separation; this, in circular disks, might vary from unity at the centre to

2.9 at the circumference, if the conducting power were perfect.

Having constructed disks of sulphur, beeswax, gum lac, sealing wax, and crown glass, of exactly the same shape, weight, and dimensions, with the side that was to repose on the surface of pure mercury as highly polished as possible, I determined the adhesive force of each of these; the resulting numbers, the mean of several experiments, were as follows:

Crown Glass . . . .	55
Gum Lac . . . . .	50
Sealing-wax . . . . .	50
Sulphur . . . . .	45
Beeswax . . . . .	20

The mercury experimented upon, had been three times distilled with care; a very dry day was selected, and after all moisture had been expelled by heat, the experiments were made in a vessel containing chloride of calcium. I satisfied myself of the absence of all electricity, by the test of an exceedingly sensible gold leaf electrometer. The results afforded by a torsion balance were—

Glass . . . . .	18
Lac . . . . .	16
Sealing-wax . . . . .	15½
Sulphur . . . . .	11
Beeswax . . . . .	7

Although these do not bear the same proportion to each other, as the numbers in the preceding table, yet they follow exactly the same order. But fearing there might be some mistake arising from the construction of my torsion balance, I took a long magnetic needle, and furnishing it with a gilt pith ball, insulated by a filament of gum lac, I noticed the effect caused by the moveable ball and proof plane. The numbers reduced to the standard of glass, in the last experiment were—

Glass . . . . .	18
Lac . . . . .	16.2
Sealing-wax . . . . .	15.82
Sulphur . . . . .	12.1
Bees-wax . . . . .	7

I afterwards found that the same results might be obtained, in a rougher manner, by observing the distances at which each of the excited disks would effect a gold leaf electroscope.

The numbers thus found would probably agree better with those obtained by adhesion, if they were properly corrected. In the first place, the conducting power being variable in the different substances, will derange the result, and the expression for those in which it is greatest, ought to increase. There is another source of error, for which I see no remedy,—the attractive force exerted between glass and air; there can be no doubt, that air actually *wets* glass, and this is a circumstance of some importance to chemists. I have noticed in an analysis of gaseous matter, traces of the presence of atmospheric air, which I am certain could be derived from no other source but this.

But if it cannot be rigidly proved that electricity is the cause of capillary attraction, by an exact correspondence of rigorous measures, such an opinion could be supported by no slight argument, if it was found that electricity exercised an apparent control over all the phenomena of capillary action.

Reasoning on the principle laid down, I succeeded in ascertaining in a distinct and positive manner, that electricity has complete control over chemical action, and that it can disturb the position of liquids in tubes, with the same ease, and quite as powerfully, as it can disturb the position of the magnetic needle. It might at first be supposed, that this could be effected by electrifying mercury, or water, in a capillary tube, furnished with a cistern, by means of a common machine; but a moment's consideration would show that this is an error. Owing to the expansive force of the electric fluid, it will, as is theoretically shown, occupy only the ex-



treme part of the arrangement, and from this circumstance no particular result could be reasonably expected. Hence, though water be electrified in this manner, until it gives out sparks an inch or two long, it will remain in its original position in the tubes, even though the finger be approached very close to it. It is immaterial whether the electricity be positive or negative, or whether mercury or water be employed.

But whilst electricity of tension only affects the surface of bodies, electricity produced by the galvanic battery, occupies itself with their constituent atoms. It is from this source we must look for the effect. Now, if water be placed in a tube by itself, and the terminal wires of a galvanic battery being immersed in its extremities, it showed no disposition to be affected, the reason would be obvious; the attraction of capillarity is between the water and the glass tube, whilst the electric current passes down *through the water*, without at all interfering, so as to alter the position of the suspended fluid. From this it is evident, that the tube must communicate with one pole of the battery, and the suspended liquid with the other. Further, the tube and the liquid must not only both be capable of conducting electricity, but it is also essential, that their conducting power should not be the same, or the electricity will pass from one to the other with too great velocity to cause any disturbance. To meet all these requisitions, and likewise to observe the reaction upon the capillary tube, I took a tube of glass, one-tenth of an inch in diameter, and wetted it thoroughly with water; I then placed it in a cup containing mercury and distilled water. The water rose in the tube; and on lowering it into the mercury, the mercury experienced its usual depression. The apparatus might now be regarded as a tube of water, containing mercury depressed in it by capillary attraction. I now made this tube of water positive by uniting it with a battery of fourteen Wollaston plates, and on making the mercury in the cup negative, the mercury in the tube instantly rose.

The only form in which the experiment will succeed, is when the positive pole dips into the *water* of the capillary tube, *and not into the mercury*. It is immaterial whether the

negative pole dips into the mercury, or the circuit be completed elsewhere.

Some might incline to suppose, that as the rise takes place from the negative to the positive wire, it might receive ample explanation from the fact, that the electric current passing in the same direction, carries it mechanically with it. If the effect depended on this cause, the position of mercury ought to be deranged, by the passage of a stream of electricity from a common machine, but this is not the case; for strong explosions from a Leyden phial, may be passed in either direction through the tube, even at the risk of bursting it, and the position of the mercury will still remain unchanged. But the most decisive experiment is this: if a positive platinum wire pass down the axis of a capillary tube into the water, and the tube and its wire be very cautiously elevated, whilst the mercury communicates as before with the negative wire, *at a particular position*, the water will experience an instantaneous depression, and will fall in the tube the whole length of the platinum wire. The particular position is, when the immersed extremity of the tube has just quitted the surface of the mercury, and the effect arises from an increased attraction between the mercury and the water. When a copper wire from the galvanic battery dips into mercury, it becomes wetted, and the mercury rises with a wave-like motion. But as in most other molecular actions, the phenomena are very complicated, the mercury having risen on the wire, capillary attraction, strictly speaking, is at an end; the mercury overcoming the attraction of the wire for itself. Change of capacity for caloric is the immediate result of change of composition, and heat is either absorbed or developed.

I have said, that, in the arrangement pointed out, a rise takes place; I would not, however, be understood to mean that such is always the case. That rise may be converted into a fall, and still all the reasoning will apply. All that results from the theoretical action of a battery, is an increased pressure. This, under the control of disturbing causes, will produce a motion, but the direction of that motion is entirely governed by circumstances.

Before proceeding to the converse of this experiment, to show the depression of liquids, I may observe that all these changes of position are accompanied by certain and definite changes of figure of the bounding surface. It appears from the theory of Laplace, that an increase of attractive force ought to be accompanied by such a change of figure; which is the result of an equilibrium of the variable attractive force, and the cohesive power of the liquid. Reasoning upon these principles, it would appear that as the attraction between water and mercury increases towards equality, with the value of half the cohesive force of mercury, the bounding surface becomes of a less curved figure, and a rise takes place. From being convex upwards, as the surface approaches horizontally it becomes plane, and finally ends in being concave. That a rise ought to take place, is shown by Laplace; for suppose the chord of the arc given by any section of the meniscus, to remain constant, the curvature of the arc becomes more and more sensible, forming a greater part of the circumference, whose radius becomes smaller and smaller, at the same time, the number of molecules contained on the bounding surface increase, and by a necessary consequence, the action of the meniscus itself increases; we may therefore assume, that, if a variation of the attractive force produces a change of figure, change of figure *may* be a legitimate indication of variation in attracting force.

In reversing the former experiment, so as to cause wetting liquids to rise higher, and mercury to be depressed beneath its usual level, regard must be had to disturbing causes, which may arise from the chemical nature of the liquids. A descent of mercury may be caused by altering the connexion of the polar wires. The mercury which, in the former experiment, was made negative, is now to be made positive, but as soon as this is done it becomes covered with a coating of oxide, which blocks up the tubes, and prevents any decisive action. Liquids capable of dissolving the oxide must be employed, and with sulphuric acid the rise and fall take place, on altering the communication. The simultaneous ascent of mercury, and descent of water, is instructively shown thus:—

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Place two plane plates of glass parallel to each other, so that there may be a communication from their sides, with mercury and water in a reservoir. Make the water positive, by means of a platinum wire extending into a space between the glasses; on making the mercury negative, it immediately rises between the plates, and the water falls through the open sides, carrying with it any small particles of dust, or other light substance, placed there to show the path of the current. On breaking the communication, the currents return; flowing backwards, and things remain as before making the experiment.

It might here be objected, that no motion whatever ought to take place, from the elements laid down, the water having just as much tendency to descend as the mercury to rise; for, from the very nature of disguised electricity, the positive and negative electricities are in the exact ratio for neutralising each other, which ratio is that of equality; an increased pressure only ought to take place.

This objection is easily obviated, when we remember that water and mercury differ in many respects; for instance, the inertia of the one is greater than that of the other; their action on the glass which included them is very different, and all these things are to be considered as modifying the effect. On electrifying two substances, these trivial circumstances exercise a powerful influence, and may even determine a motion in direct opposition to what it ought to be. To chemists this is no new doctrine; these very forces, acting on this very electricity, determine so many chemical changes in direct opposition to affinity, else how can we give an explanation, that iron turnings decompose water at a red heat, and at the very same temperature peroxide of iron is decomposed by hydrogen gas.

Aided by these considerations, I have contrived an arrangement to illustrate them experimentally. It consists of an inverted syphon, one of whose legs may be about one-tenth inch in diameter, and the other one-half inch. Mercury is to be poured into the syphon, until it rises in the smaller leg; pour upon it, in that leg, sulphuric acid; make the acid

positive, and the mercury negative, and instead of a rise, a fall takes place. Change the communication, and there is a rise.

It may be remarked, that this alteration of rise and fall is decisive of the idea, that motion is produced by the mechanical action of the currents; if that were the case, the motion in both instances should be alike, if the direction of the current was the same in both cases. I took the unequal legged syphon, filled with mercury and sulphuric acid, and caused the current to pass in its course along the wire of a galvanometer. The sulphuric acid was now connected by a wire passing from it to one of the galvanometer cups; the mercury in the wide leg had a thick amalgamated wire dipped into it, which proceeded from the negative pole of the battery. On completing the communication by a similar wire from the positive pole, the galvanometer needles traversed west. On reversing the communication, the mercury rose, and the needles traversed east. On substituting spring water for the sulphuric acid, and making the water positive, it instantly fell, vibrating about its lowest point of descent, and when it rose, vibrating about its highest. It is to be remarked, in making this experiment, that when the mercury is rising, the watery tube moves with a waving motion between the glass tube and the mercury, and if the battery be in sufficiently vivid action and the tube small enough, it will pass down in direct opposition to the laws of hydrostatics, by several inches of mercury, and make its appearance in the other leg of the syphon.

I now took a syphon, whose legs were of equal diameter, and having made the water positive and the mercury negative, there was a rise, the needle traversing west. On reversing, and making the water negative, the mercury blackened the tube, but did not move, the needles going east. Now, connecting this and the last experiment, we find in one, a current deflecting a needle westward, causing a rise, in the other a fall. This I take to be proof sufficient that the mere motion of a current, dragging the mercury in its path is quite unequal to produce the phenomena.

Perhaps some may imagine that a reasonable account may be rendered of this rise and fall, on chemical and hydrostatic principles. In the case where mercury rises in straight tubes, hydrogen gas is freely developed from its surface, and though most of the volatile metals are prone to form combinations with hydrogen, as tellurium, potassium, and arsenic, it nevertheless does not follow that these compounds must be gaseous; for instance, the solid compound of hydrogen and potassium of Gay Lussac and Thenard, and a similar compound of hydrogen and arsenic, formed by Davy. If, it may be said, an union of this nature took place between mercury and hydrogen, and the resulting compound was soluble in metallic mercury, it would, in all probability, be specifically lighter than mercury, as is the case with the ammoniacal amalgam; and on its formation it would disturb the hydrostatic equilibrium in the syphon, and a rise must take place to compensate for such disturbance. In the case where the mercury falls, why may not the hydrogen escape, and the oxygen unite, either with the water or the mercury. Now from Dulong's experiments it appears, that the oxide of hydrogen is soluble to a certain extent in mercury itself, and peroxide of mercury is of greater specific gravity than water. Either of these suppositions, would account for a movement in the branches of the syphon.

In the first case, where a compound of mercury and hydrogen is assumed to be the cause of a rise, I would merely remark, that we have no warrant for supposing any such compound can be formed, and generally to the whole objection I make this reply.—The rise takes place *in a moment*, the instant the current passes, so that there is not sufficient *time* for any compound to be formed, at least not to an extent sufficient to disturb the hydrostatic equilibrium. Again, in the case of a rise in a tube of pure water, it is evident, after the current has ceased to pass, the mercury ought either to remain suspended, or slowly to disengage hydrogen whilst sinking. Now neither of these results agree with observation; the moment the current ceases, the hydrogen drops, without disengaging the minutest bubble of gas. In repeating this ex-



periment, care must be had that the water is pure, or at least only rendered a sufficient conductor, by substances which contain no alkaline matter; for instance, if chloride of sodium be present, the resulting amalgam will disengage hydrogen for some time after the current has ceased to pass; but even in this case, sufficient evidence may be had against this objection, for the sinking of the mercury is almost as instantaneous as its rise, and it is not until after *it has fallen*, that the disengagement of hydrogen is perceived. Again, if oxide of mercury be the cause of the fall, it should be remembered that the fall ought to be permanent. And as to peroxide of hydrogen, it is a substance so notoriously liable to decomposition, and requiring so large a volume of oxygen for its formation, that I cannot for a moment conceive any possibility of its presence at all affecting the experiment.

Again, it may be doubted, whether the current itself, or some peculiar quality of it, is the cause of these phenomena; or whether they do not arise from the electro-dynamic action of the wire, upon currents traversing the mercury.

On approaching a strong bar magnet in any position with regard to the apparatus, no disturbance ensues, and the poles of a powerful horse shoe are equally inert. A battery, consisting of a few large plates, though it will make the galvanometer needles turn violently round, will by no means cause that change of level, which a number of smaller plates will occasion. It therefore requires that peculiar voltaic arrangement, which is exactly suited to chemical effects. A larger number of moderate sized plates, has the most energetic action. Hence another important inference may be drawn—if, as we see the same arrangement controls capillary attraction, that is most effectual in disturbing affinity of chemical action; and if chemical attraction is identical with electricity; then there is great reason to suppose capillary attraction is referrible to the same cause.

The evidence which it was my intention to bring forward, to show what strong suspicions there were for supposing that capillary attraction is due to electricity, may be regarded as complete; but a number of arguments may be adduced

in addition. I would ask, what better proof have we of the truth of any scientific theory; we see that all the phenomena of capillary action may be legitimately accounted for by the laws of electricity; we see that the measure of the one is the measure of the other; that when the one increases or decreases, so does the other, in the same proportion, and that the one has that control over the other, that a cause might be expected to have over an effect. But lest, deceived by specious appearances, we should form an erroneous opinion, let us see how new facts will elucidate the matter, holding ourselves ready to forsake any theory, however plausible it may appear, the moment we find one fact that contradicts it. In doing this, I have to require a distinction to be made between things that *cannot* be explained on these principles, and those that I am unable to explain. For in treating on an intricate subject like this, where the actions of that unaccountable agent **ELECTRICITY**, are deeply involved, it would be vain entirely to rely on my humble ability. There was a saying of old, that it required a clever charioteer, to turn his horses in a narrow chamber,—how then shall I hope to guide such an ungovernable steed, and grope the way in darkness?

I believe that it was Sir H. Davy who first noticed the convulsions of mercury, when electrified under water. In a watch glass, I placed about an ounce of mercury, and poured on its surface water, rendered a better conductor by a drop of sulphuric acid. The mercury was now made negative, and on dipping the positive pole of the battery into the water, a rotary motion was produced, exactly similar to that which would be exhibited by a current passing from a blow pipe over the surface of the water. Now, it is to be remarked, that the arrangement is the same as when mercury rises in a straight capillary tube; the mercury in both cases is to be in connexion with the negative pole. On reversing, and making the mercury positive, no motion is produced in either case.

As the battery I made use of in all these experiments, consisting of fourteen three inch Wollaston plates, was much too powerful when charged in the ordinary manner, I poured the exciting fluid from the cells, and replaced it by water rend-

ered slightly saline by common salt. The action of the battery was now much moderated, and I observed, on repeating the experiment, that on making an arrangement as described, for producing currents, the mercury suddenly became more globose. On breaking the communication, it gradually dilated again, becoming a very oblate spheroid, much flattened at the upper part. At the time of its greatest convexity, a slight current was seen, carrying light bodies in its vortices, and betraying the energetic gyrations, which the particles of the mercury were accomplishing, whilst the little globule was detained, in such a state of force. On reversing, there was a motion produced. It is easy to show that this change of figure proceeds from a change in attractive force of the bodies in contact. I made this experiment in another manner; I took a glass tube of such a diameter, that it would contain a little acidulated water, and a globule of mercury, without the spherical figure of the latter being deformed. In the bottom of the tube, a platinum wire was sealed; this the mercury reposed upon, and it likewise served to communicate with the negative end of the battery; on passing the current an instant deformation of figure took place. The upper surface flattened, and the mercury touched the tube all round, in a complete ring. Its surface was ploughed by gentle currents, and in the thin aqueous tube thus formed, decomposition rapidly took place.

Let us pause, to make a few useful applications of the knowledge we have acquired. Nearly one hundred and fifty years ago, Huygens saw with astonishment, that in a tube of a few lines in diameter, mercury might be made to stand at the height of seventy inches. This phenomenon is constant, when the interior of the tube is quite dry, and the mercury desiccated by long boiling. It receives an explanation on these principles. When the mercury is made to descend, in a dark room, to its usual barometric height, the vacuum is pervaded by a lambent electrical flame. This phenomenon takes place, to a greater or less extent, in all barometers; those that are most free from moisture and gaseous matter, being most liable to it. In tubes of a large diameter, it is

manifested by an adhesion of mercury to the tube, which must be overcome by tapping the case of the instrument, or other mechanical means. I took a tube four-tenths of an inch in the bore, and having made it perfectly clean, I exposed it to as strong a heat as it could bear, without altering its figure; whilst it was hot, one end was sealed, and the other bent like a syphon barometer. Mercury which had been distilled three times, at a low temperature, and then made to boil violently for a few minutes, was poured into it; it was again boiled for rather more than four hours. The adhesive force of the mercury to this tube was remarkable; it could never be brought to stand at the same altitude, in two consecutive experiments. The slightest motion filled the tube with a pale electrical flame.

On the same principle may be explained an experiment, made by P. Abat, which has not a little puzzled philosophers. In a syphon, whose branches are of equal diameter, pour some mercury, so that its height in both branches may be equal. Make the mercury rise in one of the legs by inclining the syphon, and then slowly return it to an upright position; the mercury will now stand higher in the branch in which it rose, the hydrostatic equilibrium being destroyed. From the principles laid down, it is plain this should be the case. When the syphon is brought to its greatest inclination, the tendency of the electricity developed by the contact of glass and mercury, is to produce a species of adhesion, and if the motion in restoring the syphon to its former position be gradual, that adhesion has time to take effect.

Dutrochet, I believe, for I have not yet seen his original work, saw that endosmosis might receive an explanation from the action of electrical currents, founded on a galvanic experiment, made many years ago. Circumstanced as I am with regard to his writings, I cannot criticise them. If, however, he supposes the endosmosis is due to electrical currents, I submit that it is an error. For it appears, that a very simple explanation may be given. The liquid, whatever it may be, that has the greatest attraction for the bladder, or other porous substance, passes through by common capillarity; as soon



as it reaches the upper system of tubes, it unites with the other liquid; in the case of alcohol and water, for example, the water passes through, and unites with the alcohol: this compound has not the same force of capillarity as the water alone, consequently the water still continues to rise, its upper surface being in a manner removed, by uniting with the alcohol, just as the sap continues to rise in trees, as the upper end of each filamentary column is removed, by evaporation from the surface of the leaves.

Setting out with these ideas, I attempted to determine the matter experimentally, I stretched a disk of bladder over a light metallic ring, and suspended it horizontally in equilibrio from the arm of a balance. The liquids experimented on, were taken from the same phial as had been used for verifying the endosmosis—they were, distilled water, proof alcohol, and a mixture of each. I expected that by ascertaining the force required to detach the bladder from them, I should know their comparative cohesion. From other circumstances I knew that the ratio of the electricity developed by alcohol and bladder, and by water and bladder, was something less than that of six to ten.

Exp't. 1.	} Force required to lift a disk of	20.1	33.4	23
2.		20.1	33.1	23
3.		19.8	33	23

It appears that the water passes through bladder with a force represented by 33; whilst the alcohol only attempts the passage with a force represented by 20; of course, the greater pressure prevails, and the water passes. On arriving at the other side of the bladder, it forms a compound with alcohol, and the backward pressure now amounts to 23. The water, therefore, still continues to rise. I have used these numbers in a rough manner; they do not accurately express the forces, but are a sufficient approximation for the purpose of illustration.

Guided by these principles, it appeared to me, that a material improvement might be made on the common galvanic battery, if the electricity developed during the mutual diffusion of liquids into each other, was added to that developed by two metals,

acted on by a chemical menstruum. To put this into practice, I made an arrangement in a glass tube, half an inch in diameter, consisting of two metallic coils, one of copper and one of zinc, to each of these a copper wire was soldered. The zinc coil was at the bottom of the tube, through which its copper wire passes, being made water tight with gum lac. The copper coil was situated at the upper extremity, and about one inch distant from the zinc. Now on putting a strong solution of muriate of soda in the bottom of the tube, and dilute muriatic acid, of less specific gravity, at the top, during the act of diffusion of these liquids into each other, a strong current of electricity, it was presumed, would pass along the connecting wires. It was with no small pleasure I observed a full corroboration of the truth of the principles on which I was reasoning; for on introducing the poles into a drop of water, instantaneous decomposition ensued with considerable energy.

A plate of zinc, one-eighth of an inch in width, and half an inch long, fitted with a similar copper plate, by the aid of the solution above referred to, is perfectly adequate to the decomposition of water. A battery of half a dozen such tubes, bears a favourable comparison with one of fifteen Wollaston plates on the old construction.

In continuation of this research, on the power that one substance possesses of penetrating into the pores of another, as nearly measured by their power of cohesion, I was led to repeat the experiments formerly made by Guyton De Morveau, on the adhesion of disks of metal, to the surface of quicksilver. The results were—

1 Gold	-	-	-	-	6 Zinc
2 Silver	-	-	-	-	7 Copper
3 Tin	-	-	-	-	8 Antimony
4 Lead	-	-	-	-	9 Iron
5 Bismuth					

Which is likewise the order of their affinity,—another proof that chemical affinity and capillary action, are to be attributed to the same cause.

In repeating these experiments, I had occasion to notice incidentally, the production of heat, the moment mercury was

touched by gold. This remark was made many years ago by Boyle, as may be observed in his essay on the Mechanical Origin of Heat and Cold.

It might be predicted, from the experiments of Pouillet, that gasses must exhibit the same phenomenon. A piece of red hot charcoal, when I had cooled it in mercury, and then immersed it in an atmosphere of ammoniacal gas, had its temperature suddenly raised. When it was surrounded by a mixture of atmospherical air and hydrogen gas, and the temperature slowly raised, the heat developed by the charcoal was such, that it set fire to the gaseous mixture, acting in the same manner, though not so energetically, as spongy platinum would have done.

This principle offers an explanation of the decomposition of the peroxide of hydrogen, and persulphuretted hydrogen, by several substances which have no chemical action on them. These compounds only exist at certain low temperatures, for a heat much short of  $212^{\circ}$  Fah., entirely decomposes them. The metals, and metallic oxides, likewise act in a very energetic manner; I am now speaking of the peroxides, which do not pass to a state of higher oxidation, during the action. On dropping any of these into a tube, containing peroxide of hydrogen, an instantaneous explosion ensues, and the tube becomes hot. The decomposition takes place, in consequence of the heat disengaged by capillary action; at least, the heat which must of necessity be developed from that cause, would be sufficient to decompose the layer of peroxide of hydrogen, immediately reposing on the oxide, even if no other disturbance was in action. And agreeably to this, we find, that in many cases oxide of silver will be reduced itself, whilst it is reducing peroxide of hydrogen.

There is a point, in connexion with this, to which I would refer. A liquid cannot repose on the surface of a solid, without the disengagement of caloric. A gas cannot pass through a capillary tube without changing its temperature. Hence, in the phenomenon of endosmosis, of liquids and gases, the membranous partition is of necessity obliged to undergo a change of temperature. For this reason it is well worth the

inquiry of physiologists, whether animal heat may not in a measure be traced to this source. It is impossible that such changes as take place during respiration, should proceed without exaltation of temperature, but it is equally impossible, that the phenomenon of endosmosis, taking place at every breath we draw, should proceed without exaltation of temperature in the membranous septa of the lungs, and the whole vital apparatus. From Dulong's researches it appears that, supposing all the oxygen that has passed into the state of carbonic acid, has really combined with carbon during respiration, and supposing all the oxygen which has disappeared has combined with hydrogen to form water, and that the sum of these two quantities of caloric, accurately represents the whole quantity of heat produced by the chemical changes of respiration, the amount is too small by one-tenth, and often by two-tenths, of the actual quantity.

I might now proceed to add something concerning those chemical decompositions, which may be effected by the mere action of capillarity, as exemplified in the cases of deutoxide of nitrogen, atmospherical air, and pure ammonia; and likewise to show how much these processes are controlled by the condensation of those gases. I might likewise speak of those molecular motions, which silently take place in the innermost recesses of solid bodies, and indicate the laws of the movement and equilibrium of those systems of atoms. For we are not to suppose, because the texture of solid bodies appears to be the same for many years, that there is no movement of their constituent parts. I might proceed to consider the magnitude and shape of those atoms, and how one system of them may be made to disturb the motions of another; the distance there is between atom and atom, and how it is affected by their orbital paths, and vibratory oscillations. I might show how the disguised electricity, produced by near approximation, acts on these elementary systems as a centripetal force, and how the caloric which is produced under these circumstances acts as a counterbalance to prevent their fall on each other. But so long as hypothetical considerations are involved in these researches, and until the geometrical investigation is corro-



borated by extensive recourse to experiment, we cannot hope to come to an undoubted conclusion.

If we look once more on the mass of evidence which appears, we shall find, that all the phenomena of capillary action may be explained according to the laws of electricity,—that electricity is produced in some of the chief cases of capillary attraction, its development keeping pace with the intensity of attraction. We shall find, that whatever disturbs the production of the one, disturbs the action of the other. That the formulæ of Clairaut, developed many years ago, receive, upon this doctrine, experimental corroboration—and that the attractive force may be measured by the torsion balance. If further proof were wanted, we should find it in the complete control the galvanic battery has over the height of a column, whether of mercury or water, suspended in tubes, making it rise and fall at pleasure; and what ought to be an argument to a chemist, this is done by that arrangement which effects that affinity, which is said to be due to electricity. The endosmosis of Dutrochet is explained, not hypothetically, but by recourse to the balance; and to show that we may employ this theory to advantage, it has proved a guide for discovering arrangements in galvanic batteries of unusual intensity. It is found that the electrical excitements of different metals and mercury, as determined by their affinity, keep pace with their capillary action. The singular evolution of heat, produced by molecular action, affords another passing proof to that type—the polar connecting wire of a voltaic battery. The physiological application of this fact, is striking and important; and if any thing be wanting to complete the chain of evidence, it may hereafter be found in the power that capillary attraction possesses over chemical affinity.

Christianville, Va. July, 1834.

*Jour. Frank. Inst.*

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## ART. LXVII.—ON MANNITE FROM THE BULBOUS CELERY.

By M. PAYEN.

For several years past, I have pursued a series of investigations, on those immediate principles of vegetables which occur in large proportion, and which may be useful to man.

I have already shown, that in tubers of the Jerusalem artichoke and dahlias, the most abundant immediate principle is inuline, a substance which is transformed into sugar by many acids, but upon which diastase has no action.

That the sugar of melons is crystallizable, and identical with that of beets and the sugar cane.

Finally, M. Henry and myself have ascertained that the sweet potatoe contains not only an analogous sugar, but also furnishes a fecula which is as agreeable as the best foreign arrow roots.

M. Tollard having lately sent me a root of the bulbous celery, (*Celeri rave*), for examination, I soon perceived that it contained no starch, but that mannite existed in it in large quantities, accompanied by a coagulable azoted substance, some salts and traces of an essential oil. Not only was the proportion of mannite remarkable, but the ease with which it could be extracted also attracted my attention. The plan I followed, might be followed on a large scale with advantage.

By the aid of a grater, the root was reduced to a pulp, which was subjected to a strong pressure. The expressed juice was very viscous. It was boiled, when an abundant scum separated, and the viscosity disappeared.

The substance, thus coagulated by heat, was placed on a filter, washed and dried; on calcination it gave azotized products; it formed 0.04 of the juice.

The fluid separated from the scum was filtered through coarse animal charcoal, then rapidly evaporated to a syrupy consistence, and suffered to remain at rest in a cool place. On cooling, it formed a mass of crystals radiating from numerous centres. This mass, subjected to a gradual pressure,

afforded mannite in white, acicular, brilliant crystals, which by a single operation, namely, by wetting them and again submitting them to pressure, were rendered sufficiently pure for use.

When they were dissolved in hot alcohol, they separated on cooling, in the form of elongated crystals, united in groups presenting the appearance of spherical aigrettes.

The mannite formed about 0.07 of the juice. This proportion may vary according to the soil, the culture, the season &c. It is certain that the most abundant principle in the bulbous celery is mannite, and that it can thus be obtained more economically and purer than from manna. Its agreeable taste, and the pectoral qualities observed in it ought to entitle it to notice.

*Journ. de Chim. Med.*

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ART. LXVIII.—NOTE UPON CREOSOTE. By A. BUACHNER, of Munich.  
Translated for the Journal of Pharmacy, by CHARLES ELLIS.

THE extended labours of M. Reichenbach of Blansko, in Moravia, upon tar, his discoveries of creosote, of eupion, of parffian, of picamar and pittakal, are so well known in France, as to render superfluous any discussion of the preparation and properties of these products of dry distillation. Upon creosote alone, the preparation of which I have had occasion to make many experiments in my laboratory, I will venture to communicate a note, with respect to its medical properties and mode of preparation.

M. Reichenbach directs the creosote to be prepared from the tar of beech wood by six distillations, and the product to be dissolved three times in a solution of caustic potass, and each time to be precipitated from that solution by sulphuric acid.

I have found that creosote may be obtained of the same purity from the tar of pine wood, and that by observing the

precautions which I am going to indicate, it is unnecessary to repeat the operations so often.

1st. In the first distillation of tar, which is done in an alembic, care must be observed frequently to remove the product, (oil of tar,) and to change the receivers. At first nothing but eupion comes over, which floats on water, but as soon as any of the oil poured in water precipitates to the bottom, it is formed in great part of creosote, and the distillation must be continued until the residuum has acquired the consistence of black pitch.

2nd. The oil which is heavier than water, is then agitated with a small quantity of concentrated sulphuric acid, to deprive it of ammonia, and to assist in its discolouration.

3rd. It is then mixed with an equal volume of water and agitated, and afterwards rectified in small retorts.

4th. The product of this distillation, which sinks in water, consists, for the greatest part, of creosote; having dissolved it in a hot solution of caustic potass of specific gravity of 1.120, this concentrated solution was left for some time exposed to a gentle heat to deposit. The eupion then, if any of it remain, will float on the surface, and must be carefully removed.

5th. After this alkaline solution has become cold, a slight excess of sulphuric acid is to be added to it, by which the creosote is set at liberty.

6th. The creosote separated from the solution of sulphate of potass, is again distilled in small retorts, taking care as in the first distillation, occasionally to remove the product; the distillation advances slowly at first, with much agitation, on account of the water present. The first product consists of water and a little eupion, which must be rejected. The residuum in the retort, is formed of a brownish mass.

7th. If the creosote obtained in this manner is again rectified two or three times, without any addition, it is sufficiently pure for medical use.

The operator will soon discover the precautions necessary to be observed.

Creosote must be colourless, of great refrangibility to blue



and yellow, of specific gravity, 1.037 at 20° Cent.; and its alcoholic solution mixed with barytic water must not change to a brown colour by exposure to air. It commences to boil at 203° Cent., and distils without any alteration. It possesses a very marked odour, which resembles that of smoked meat and castor at the same time. With respect to its general properties, they comport with those of an essential oil. As to the medical virtues of creosote, several physicians at Munich have confirmed its antiputrescent, dessicative and styptic qualities. In the cure of sluggish, cancerous and syphilitic ulcers, of tetter, itch, and caries itself, its employment has been attended with the most happy success.

It is principally employed externally, by friction, either pure or in watery solution. The latter is usually prepared by the addition of one pint of creosote to eighty parts of water. To obtain the water of creosote more concentrated, I first prepared a tincture of one drachm of creosote to two ounces of alcohol, and then added it in drops to the water to obtain the strength required—that is until it began to be opaque. I am convinced that it is an excellent water to arrest the decay of teeth. It is one of the best remedies against pain from carious teeth, applied by means of a camel's hair pencil, either in its pure state, or the alcoholic solution made by one part of creosote to eight or sixteen of alcohol. It is for the above purposes that it is already much employed in Germany.

Its internal use has also been attempted, and M. Reichenbach furnishes many facts of its having been used with great success in the treatment of dysentery. This chemist believes that the respiration of vapours of creosote with air will be attended with very beneficial effects against suppurations, both in the wind pipe and in the bronchial vessels. We learn from the experiments of several physicians of Munich upon dogs, that the action of creosote is entirely local, and that no absorption occurs.

The carotid artery, for instance, has been cut in the middle, and the blood being stopped for a few moments by press-

ing the finger on the wound, whilst a piece of lint wet with creosote was applied; after removing the finger, the artery had ceased to bleed, and the healing of the wound followed in a few days even without a bandage.

*Journ. de Pharm.*

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ART. LXIX.—ON SEVERAL ALKALOID PRINCIPLES, FOUND IN THE SOLANÆ BY GERMAN CHEMISTS.

ATROPINE.

M. BRANDES thought that he had extracted this organic alkali from the *ATROPA belladonna*, but his experiments were not confirmed, and the existence of atropine was still problematical, when the investigations of M. M. Geiger and Hesse appeared on the one part, and those of M. Mein of Neustadt, on the other. The first mentioned chemists obtained this alkali from the extract prepared from the stems and leaves of the belladonna; the latter extracted it from the root, and to M. Mein belongs the honour of first obtaining it in a state of purity. This process, which is the most simple, is as follows:—Twenty-four parts of dry roots of belladonna, obtained from plants of two or three years of age, and which are heavy, and break with a slight resinous lustre, are to be taken; after having been reduced to an extremely fine powder, they are to be digested with 60 parts of alcohol of 86° to 90°; the digestion is to be continued for several days; the mass subjected to pressure, and the residue again heated with the same proportion of alcohol as before. The tinctures being united and filtered, are to be mixed with one part powdered hydrate of lime, and the mixture shaken frequently during twenty-four hours. After having again filtered, to separate the copious deposit that has formed, diluted sulphuric acid is to be added drop by drop, until in slight excess. The sulphate of lime which is precipitated, renders it requisite to again filter the mixture. After this, the alcoholic tincture is

introduced into a retort, and distilled till one half has passed over; to the residue in the retort is to be added six or eight parts of pure water, and the liquid heated in a porcelain capsule, over a very gentle fire till all the alcohol has evaporated. The residue is to be filtered, if necessary, and evaporated to one third. After cooling, a concentrated solution of potash is to be added, drop by drop, stirring gently, as long as the fluid is turbid, when the mixture is suffered to stand for a few hours. This last addition is to precipitate a greenish resin, which gives the fluid an iridescent appearance, and militates against the crystallization of the atropine. If the fluid which contains the sulphate of atropine is sufficiently evaporated, or not too poor in atropine, it generally forms a gelatinous mass a short time after the addition of the carbonate of potash. The mother water is to be carefully decanted, or separated by means of a filter, and a solution of carbonate of potash again added till the fluid is perfectly transparent.

The mixture, when left to itself for twelve or twenty-four hours, often presents at its surface or in its substance, white crystals of atropine. By shaking, the molecules of the gelatinous mass are much condensed, and set free a large proportion of mother water, which is to be removed as soon as possible by the filter and compression between sheets of blotting paper.

As the atropine, when recently prepared, is still moist and impure, and loses much by being washed with water, it must be dried and then formed into a paste with water, which is to be promptly removed by compression between sheets of paper, and the residue again dried. This atropine, which is still impure, is to be dissolved in five times its weight of alcohol, the solution filtered, and six or eight times its bulk of pure water added to it. The fluid becomes milky by this addition, or soon assumes this aspect on the evaporation of the excess of the alcohol; at the end of twelve to twenty-four hours, the atropine will be found deposited in crystals of a bright yellow colour; after having been washed with a few drops of water, they are to be placed on blotting paper and dried.

These crystals are again to be heated in the same way as



above, and will then afford an alkaloid which is almost white, and is regularly crystallized. Twelve ounces of belladonna root only furnished M. Mein with about twenty grains of pure atropine.

Atropine from different parts of the same plant, and by two different modes of operating, manifested to M. Mein, and to M. M. Geiger and Hesse, identical properties, with some unimportant exceptions, differences depending, no doubt, on the greater or lesser state of purity. The principal properties of this alkali are:

When pure it is white, crystallizable in transparent grouped prisms of a silky lustre. It is inodorous, soluble in absolute alcohol and sulphuric ether, and more so when aided by heat. Water, at the usual temperature only dissolves a small portion,  $\frac{1}{500}$  according to M. M. Geiger and Hesse, and this solution which M. Mein found but slightly bitter, appeared very disagreeably so to the two other experimenters. The solubility in water increases with an increase of temperature; this solution restores the colour of litmus paper, reddened by an acid; even when it is much diluted it very promptly dilates the pupil of the human eye, and this dilatation is very lasting. Atropine is not volatilized at the temperature of boiling water; but, when exposed between two small watch glasses to a more elevated temperature, it first melts, then is transformed into fumes, which restore the colour of litmus paper reddened by an acid, and which, on condensing, cover the upper glass with a varnished crust, this crust has all the properties of atropine. When heated in a spoon over a flame, atropine soon melts, gives out empyreumatic fumes, becomes brown and inflames; it burns with a bright, but somewhat smoky yellow flame, and leaves no residue.

Chlorine produces very little alteration in it, it appears to form definite saline compounds with the acids; the sulphate and acetate may be more readily obtained in a crystalline state than the hydro-chlorate or nitrate. Pure potash precipitates it of a white colour from its saline solutions, as does also caustic ammonia. The aqueous solution of atropine gives an abundant white precipitate on the addition of the



aqueous infusion of galls. It is precipitated of a lemon yellow colour, by the hydrochlorate of gold, and of an isabella colour by the solution of platina.

The manner in which this alkali acts on a slightly acid hydrochlorate of gold, appears characteristic. The lemon yellow precipitate, at the end of a few hours, assumes a crystalline structure, and appears to represent a double saline combination of atropine with hydrochlorate of gold. This observation was made by all three of the experimenters.

Concentrated sulphuric, nitric, and hydrochloric acids, dissolve the crystals of atropine without disengagement of gas; these solutions are colourless. With the aid of heat, sulphuric acid turns of a slight brown, nitric acid assumes a bright yellow tint, and hydrochloric does become changed, at least in minute experiments.

When heated with hydrated potass, atropine gives out abundant ammoniacal fumes.

M. M. Geiger and Hesse have also remarked another remarkable property of atropine; the alteration it undergoes by a continued contact with air and moisture, at ordinary temperatures. It loses its property of crystallizing, the crystals already formed disappear, the fluid assumes a slight yellow tint, and by evaporation an uncrystallizable residue is obtained, soluble in all proportions in water; this altered atropine acquires a nauseous narcotic odour. In other respects, the alteration is not considerable; the alkali is as poisonous as before, and if it be combined with an acid, and the solution treated with animal charcoal, the alkalies precipitate the greater part in a solid form, and this atropine is again susceptible of crystallization.

From the late analysis of M. Leibig atropine is composed of

34	atoms of carbon,
23	hydrogen,
6	oxygen,
1	nitrogen.

## HYOSCYAMINE.

Its existence in the *Hyoscyamus niger* was also not satisfactorily proved, until the recent researches of M. M. Geiger and Hesse.

The extraction is somewhat difficult on account of its ready solubility in water, or rather its prompt alterability on contact with water and the free alkalies, this alteration renders it soluble in all proportions in water, and even produces some decomposition of it. It is most readily extracted from the seeds; they are to be heated with alcohol, either with or without the addition of an acid, or by hot water; the fluids are to be evaporated by a very gentle heat; they are to be decolourized by treating them several times with lime and sulphuric acid, and filtering; they are to be evaporated, and an excess of pulverized carbonate of soda added; the precipitate is to be deprived, as soon as possible, of the fixed alkali, by subjecting it to pressure and treating it with absolute alcohol, and the mother waters are at the same time to be treated with ether; the alcoholic and ethereal solutions are to be mixed together, and lime again added; the mixture is then to be filtered, and the filtered fluid treated with animal charcoal, and finally evaporated by a very gentle fire, adding a little water. If the hyoscyamine is still coloured, it must be again combined with an acid, and treated as above. The product is oftentimes very small.

Pure hyoscyamine slowly crystallizes in colourless transparent needles, having a silky lustre, either grouped or disposed in a radiated form; these crystals are inodorous, but slightly soluble in water, but more so than those of atropine. The least quantity applied to the eye, causes a dilatation of the pupil which lasts for a long time. In the anhydrous state it is not alkaline, (resembling in this respect the other organic alkalies) but the addition of water develops a well marked and persistent alkalescence. When distilled with caution, hyoscyamine volatilizes, and appears to be but slightly altered, for it is as poisonous and alkaline as before. At the same time a portion of it is decomposed in this operation, ammo-

niacal fumes being given off. When it is heated with water, a small portion is also volatilized; for the distilled fluid is slightly alkaline, and dilates the pupil, but the greater portion is not volatilized. When heated with the hydrated fixed alkalies, it is completely decomposed like atropine, giving out ammoniacal fumes. This property establishes an essential difference between these alkalies and nicotine, which, when heated with the hydrated fixed alkalies, is not decomposed, (at least wholly) but volatilizes with the steam, and may thus be obtained by distillation. The aqueous solution of hyoscyamine is thickened by the addition of the tincture of iodine and assumes the colour of kermes mineral. All the organic alkalies hitherto examined present this peculiarity. The precipitate, by tincture of galls is white and abundant; yellowish white with the solution of gold; platina causes none. The salts of hyoscyamine are neutral, they readily crystallize in part, and are as poisonous as hyoscyamine; their aqueous solution acts with the above mentioned reagents, like the alkali itself. Hyoscyamine is very soluble in alcohol and ether.

#### DATURINE.

M. M. Geiger and Hesse are also the first who have really extracted daturine from the *Datura stramonium*, and described its characters. The seeds of this plant furnish the greatest proportion; the mode of extraction is the same as that for hyoscyamine; it is easier, from the daturine having more tendency to assume the solid form; but the pulverized seeds must always be heated with hot alcohol, otherwise they retain the greater portion of the daturine. This alkali readily crystallizes; it is deposited from its hydro-alcoholic solution in the form of colourless, very brilliant, grouped prisms; it is inodorous, its taste is at first slightly bitter, then very acrid like that of tobacco; it is very poisonous, one-eighth of a grain being sufficient to kill a small bird in three hours; when applied to the eye it occasions a great and permanent dilatation of the pupil.

It is worthy of remark, that M. M. Geiger and Hesse have only recognized this property, in the three organic alkalies of

which we have spoken. Solanine, at least prepared by M. Otto hereafter to be noticed, does not cause it, and nicotine produces the contrary effect.

Daturine in combination with water has a marked alkalescence. When it is cautiously heated it partly volatilizes without alteration, but a portion is destroyed with the same phenomena as with hyoscamine. When heated with water it does not volatilize, when it is subjected to the action of long continued heat, with the hydrated fixed alkalies, it is decomposed, giving out ammoniacal fumes. It is but slightly soluble in water. It requires about 280 parts of this fluid at the ordinary temperature, and 72 at the boiling point; the solution becomes turbid on cooling without the daturine crystallizing, as the same contact with water is not so destructive of it as of atropine and hyoscyamine. By evaporating the aqueous solution, crystals are not obtained at once, but if the mass be moistened, or even if the solution be permitted to evaporate spontaneously, crystals are formed. The aqueous solution of this alkali acts with reagents like that of hyoscyamine; it is also very soluble in alcohol, rather less so in ether. The salts of daturine afford beautiful crystals, which are in general unalterable in the air, and easily soluble. Their action is very poisonous. Their aqueous solution behaves with reagents like that of pure daturine. The inorganic alkalies precipitate this salt in the form of white flakes, when the solution is not too weak.

#### COLCHICINE.

The same chemists have extracted colchicine from the seeds of the *Colchicum autumnale*, by a process similar to that for daturine. It is rather more difficult to obtain in a pure and colourless state.

Colchicine crystallizes in delicate needles, it is inodorous, of a very bitter taste, at first and afterwards tart, but has not the acrimony of veratrine; when applied to the nostrils it does not occasion sneezing, whilst the least portion of veratrine induces the most violent sternutation. In a hydrated form, colchicine has but little alkalescence, nevertheless it completely neutralizes the acids, and forms with them (which



is not the case with veratrine) salts which are partly crystallizable, whose taste is bitter and tart. This alkali is soluble in water, whilst veratrine is insoluble. This solution precipitates that of platina. The action of concentrated nitric acid on colchicine is characteristic; this acid gives it a deep violet or indigo blue colour, which soon passes to green and yellow. Concentrated sulphuric acid colours it of a yellow brown; veratrine, as is well known, becomes first red, and then yellow by the action of nitric acid, and with sulphuric acid, first yellow, then blood red, and finally of a beautiful violet.

Colchicine is very poisonous; one-tenth of a grain dissolved in diluted alcohol was given to a kitten of eight weeks old; it immediately caused frothing at the mouth, and in an hour, copious liquid alvine evacuations, followed by vomiting. The animal staggered, fell, rolled from side to side, uttering plaintive cries, and appeared convulsed. These symptoms gradually increased, and finally death took place in twelve hours. On opening the body, the stomach and intestines were found violently inflamed, with an effusion of blood throughout.

#### ACONITINE.

In 1832, M. Geiger published some physiological experiments made with the aconites, from which he concluded, that in the acrid aconites there was, besides the readily destroyed acrid principle, another which was narcotic and widely dissimilar, as the leaves of the *A. napellus*, even when gathered when old, and having no acrid taste, had a very energetic narcotic power. The researches of M. Hesse confirm this conclusion. This chemist obtained aconite from dried leaves of the *A. napellus*, by much the same process as that used to obtain atropine from the roots of the belladonna. Aconitine does not seem susceptible of crystallization; in a pure state it is white, granular or in the form of a transparent, colourless mass, having the lustre of glass, and inalterable in the air; it is inodorous, its taste is bitter, and then acrid, but this acrimony is neither powerful nor permanent, very different from that of the plant, which often lasts for twelve hours or more, and leaves the tongue benumbed; the acrid principle

is intimately united to the impure aconitine, but by several times combining this alkali with an acid, and decomposing the solution, the acrimony is gradually removed. When wholly deprived of this principle, aconitine is highly poisonous; one-fiftieth of a grain dissolved in a little diluted alcohol being sufficient to destroy a small bird in a few minutes; and one-tenth of a grain acted with the rapidity of lightning. It is readily fusible, but not volatile; it gives out ammonical fumes on dry distillation; is but slightly soluble in water, but very soluble in alcohol or ether. The solutions are alkaline; the aqueous solution is not precipitated by the solution of platina. Nitric acid dissolves aconitine without producing any colour; sulphuric acid first colours it yellow, and then of a dirty purplish red. Aconitine completely neutralizes the acids, the resulting salts appear to be uncrystallizable.

#### ORGANIC ALKALIES.

M. Geiger observes that the organic alkalies may be divided into *volatile* and *fixed*; but this classification is only relative. The volatile organic alkalies are those which are volatilized at the ordinary temperature. In their greatest state of purity they are liquid, and are always distinguished by a peculiar odour. Those which are not volatile at the ordinary temperature, are solid, inalterable in the air, and inodorous when pure. But some, derived from the SOLANÆ, easily contract a nauseous, narcotic smell. Hyoscyamine forms, as it were, the link between the volatile and fixed organic alkalies.

In a physiological point of view, these bodies may be divided into poisonous and not poisonous. The volatile organic alkalies are all acrid and poisonous. Among those which are fixed, atropine, hyoscyamine, daturine, colchicine, aconitine, delphinine and emetine, are acrid, or bitter and poisonous. Morphine, strychnine and brucine, are bitter, narcotic and poisonous. Quinine and cinchonine belong to the bitter organic alkalies, which are not poisonous.

In a chemical point of view, it is worthy of remark, that

all the organic bases contain azote, and in all those hitherto examined, the remarkable law discovered by M. Liebig, that the proportion of azote gives the measure of their capacity for saturation, has been confirmed. Thus one atom of an organic alkali always contains exactly one atom of azote.

All the crystallizable substances, whether poisonous or not, but having some other energetic action, and which resemble organic saline bases, do not belong, on this account to this class of bodies. A great number of these substances which are regarded as such, are not so, and many have no azote. They present in general, in a physiological point of view, a great resemblance with organic bases; thus we know picrotoxine, whose poisonous action is strongly marked, colombine and lactucarium, the analysis of which has not been made. These substances arrange themselves near strychnine, brucine, and the narcotic principles of opium. Elatine, which is a very energetic drastic, colocyntine, bryonine and digitaline, present much analogy in their effects with veratrine, colchicine and emetine. Salicine, gentianine, and other crystallizable, unazotized, bitter principles, have an action similar to that of quinine and cinchonine. At the same time there is a marked line of distinction, for the azotized bases enjoy an action much more energetic than the unazotized neutral principles.

Alimentary substances give rise to an analogous remark, for we know that those which are azotized are much more nourishing than those which are not so.

*Journ. de Pharm.*

ART. LXX.—EXTRACTS FROM THE BULLETIN OF THERAPEUTICS. By M. O. HENRY. Translated for the Journal of Pharmacy, by CHARLES ELLIS.

IN the last numbers of the Journal of Therapeutics, of which the utility and success are every day better appreciated, we have met with the following articles, which we would point out as particularly calculated to interest our readers.

THE USE OF TAR AND SOOT IN CERTAIN AFFECTIONS.

Since the discovery of creosote, recourse has been had to the use of many substances where this matter is known to or may possibly exist.

Thus tar first gave to M. Duchesne Duparc the idea of reverting to an application, thought so efficacious by the Egyptians and the inhabitants of Holstein, in the cure of itch. Various trials led to perceive the advantages it offered in the treatment of this disease, as well from the rapidity and efficacy of its influence, as from its low price, which placed it in the power of the most indigent; a class almost exclusively affected with this malady.

M. Duparc found that a cerate made with  $\text{ʒij}$  of tar to an ounce of grease, and employed by friction upon the part affected with itch, caused the eruptions to disappear rapidly, and produced a speedy cure. He treated a great number of patients, and by comparison with other modes of practice, was led to the conclusion that the use of this cerate in suitable quantities, (half an ounce in two frictions, morning and evening, combined with the sulphur or alkaline bath, every day,) would constantly effect a cure in ten days, whilst fifteen to twenty were required by other modes of practice.

Soot is also highly spoken of as a succedaneum for creosote against inveterate tetter or ringworm, scald-head, ulcers of a bad character, &c. The decoction made by boiling two handfuls of soot to a pint of water for half an hour, and strained with expression, is at first used as a lotion. This wash is applied to the ulcers, three or four times daily, and



with the aid of cataplasms causes the scabs to fall off; pledgets of lint wet with it are also used as constant fomentations. For inveterate fistula it is applied in the form of injection. Occasional friction with the following cerate may be applied in the intervals:

Axungia	℥ij
Soot	℥ij M.

M. Caron Duvillard has also used soot with great advantage in some affections of the eyes. Sometimes by snuffing it pure or combined with sugar candy, and sometimes in the form of a cerate made with butter, which in no respect is inferior to that of Désault.

He suggests the following collyrium, which he as well as M. Baudeloque have used with success in scrophulous ophthalmia, viz.: soot ℥ij dissolved in boiling water, filtered and evaporated to dryness. The dry and shining residuum is afterwards dissolved in strong vinegar by the aid of heat, and twenty-four grains of extract of provence roses added to twelve ounces of the liquid. A few drops of this liquid in a glass of water form the collyrium. Finally, to dissipate the nebula of the cornea of the eye, the same physician advises the use of the following tincture:

Opium	℥ij
Cloves	℥ij
Washed soot	℥iv
Cinnamon water	℥viiij
Alcohol	℥iv

mix, digest for five days, strain and filter.

In applying it, touch the granulations of the cornea with a fine pencil wet with this liquor.

#### MANNITE.

Mannite, the crystallizable principle of manna, has already been the subject of many experiments, with the view of supplying the place of the latter, of which the nauseous bitter taste is very disagreeable to those who take it; but the results have not been very satisfactory.

Recently, however, mannite has been successfully administered by M. Martin Solon, in the dose of one to two ounces dissolved in from two to four ounces of boiling water, combined with some aromatic. He believes that the fresh agreeable taste of this purgative will offer great advantages in its use, if these effects are confirmed by new experiments, for this substance does not appear to produce irritation upon the intestinal canal. Since the labours of M. Payen have shown the existence of mannite in the root of the celery plant, in the proportion of six or seven per cent. and of easy extraction, [see page 310, for process,] it is hoped that this organic principle will become an object of interest to isolate, and of importance in therapeutical application.

#### PREPARATIONS OF COLCHICUM.

The bulbs, and sometimes the seeds of colchicum (*Colchicum autumnale*) constitute the base of several medicinal compounds, which possess sufficient energy to claim the particular attention of those who use them.

It is known that these bulbs, with alcohol (two parts of fresh bulb to four of alcohol of 36°) form the Eau Medicinale de Husson, so celebrated for many years. Unfortunately the published recipes for the preparations of colchicum wine, oxymel, &c. either of the old or new codex, or of different formularies, are very unlike, which renders the use of these compounds uncertain and very variable; further the bulbs of colchicum are very liable to vary in their properties according to the season when they are gathered. It is difficult to state the precise time of the year when they should be collected, except that it is about the month of August when the bulb is in full vigour.

In searching into the last works of M. M. Geiger and Hesse, who attribute the active principle of colchicum to a crystallizable matter somewhat different from veratrine, which they have named colchicine, we might without doubt, at least under these circumstances, be tempted to substitute for the preparation of colchicum, determinate quantities of this organic principle (whenever its medical properties shall have been

fully tested) combined or not with some gummy substance capable of imitating those which accompany it in the vegetable.

We certainly adopt in most instances the judicious opinions of M. Polydore Boullay, upon the danger of changing pharmaceutical formulæ, and these opinions are directed by too much good sense not to be generally appreciated; but we believe also that the employment of certain active principles, isolated from active plants, would be attended with great advantage, for generally they represent the most decided properties of the substances from which they are extracted, and it is easy to modify or weaken their effects by a combination with other ingredients. All are, at least, certain of operating with precise quantities, and with mixtures identical in their composition, which cannot always be the case, not only with those of colchicum, but many other roots, barks, seeds, &c. of which the composition or strength may vary according to the time when they are gathered, the season, or even the culpable adulterations of commerce, which are not always perceived. Finally, the facility of administering them is greatly increased, by concentrating in a small volume the active principles which constitute the base of a pharmaceutic compound.

#### UPON THE USE OF CODFISH OIL.

The oil of the liver of codfish (*oleum jecoris aselli*) formerly employed in medicine in certain countries has been again introduced into practice with great success in many affections of chronic rheumatism, and also as a vermifuge against the lombrice and ascarides.

This oil is obtained by three modes, which furnish products more or less pure. The first consists in exposing to the sun's rays, the livers of codfish piled up in tubs. A yellowish liquid flows from them (white limpid oil of codfish,) destined for internal use. After the livers have remained for some time they undergo a kind of putrefaction, and furnish a second product, *brown limpid oil*. Finally, by heating them in a cast

iron pot, a third oily liquid, still more coloured and viscous, is obtained.

The *oil of codfish* is administered internally either pure, or which is a better mode, combined with the fourth of a glass of emulsion—the dose for adults being two or three table-spoonfuls a day, and for children two or three tea-spoonfuls.

Externally, it is used by friction, either pure or combined with ether or ammonia. For the destruction of the lumbrici and ascarides it must also be used in the form of injection.

M. Caron du Villars, author of this article, announces that this medicine, which he considers as very valuable, although an unpleasant one, has never produced any alteration in the digestive functions, even when it has been given in very considerable doses.

*Journ. de Pharm.*

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ART. LXXI.—REMARKS ON PROFESSOR MITCHELL'S METHOD OF PREPARING CARBONIC OXIDE, FREE FROM CARBONIC ACID. By L. D. GALE, M. D. Acting Professor of Chemistry in the University of the City of New York, and Professor of Chemistry in the New York College of Pharmacy.

HAVING received No. 2 of vol. xxv. of this Journal, [Amer. Journ. Science and Arts,] containing Professor Mitchell's paper on a new process for preparing carbonic oxide, about the time I was to lecture on that subject before my class in the College of Pharmacy, I adopted Professor M.'s plan and followed his directions as nearly as possible, but much to my discomfiture found the gas obtained was perfectly incombustible: but I should here state that it was used immediately after preparation. As gases will sometimes burn from a large orifice, when they will not from a smaller one, I varied the size of the aperture, but all to no purpose. I then collected more gas, with "heat duly moderated," and preserved only the first and last portions, but did not succeed in causing it to burn from an orifice. I then threw up, by means of a syringe, some caustic potash into the receiver containing the gas; a



rapid absorption took place, amounting to nearly half the original quantity, and the remainder was sufficiently pure carbonic oxide. I also ascertained, that if the gas, when procured, be allowed to stand over cold water, and especially in broad and shallow receivers, for two or three hours, so much of the carbonic acid is absorbed that the remaining gas will burn with its ordinary appearance. The same remark will apply to carbonic oxide, prepared by any of the ordinary methods described in the books. Indeed, I am constantly in the habit of preparing the gas in the morning, when it is to be used in the afternoon, and thus avoid the occasion of using any alkali.

Although from the above experiments I was quite satisfied that carbonic acid is always produced in the above mentioned experiments, yet, that I might be able to speak with perfect confidence, I was induced to make a complete analysis of the gas obtained after Dr. Mitchell's plan. Taking a given weight of the oxalate of ammonia, and the proportion directed of sulphuric acid, I collected the whole gas evolved from the materials over mercury, that none should be absorbed during the operation. One hundred equal parts having been set aside for examination, pure liquid potassa was thrown up by means of a syringe, and the vessel agitated until no more absorption took place, when fifty parts of the gas had disappeared. The residual gas, on being detonated with oxygen, was found to be nearly pure carbonic oxide. In order to ascertain whether the gas differed in its qualities, at different stages of the process, I collected portions of it at regular intervals, throughout the operation, and subjected them to careful examination. The result of these experiments was pretty uniform, not varying in any case two per cent. from fifty measures of each gas; and hence I infer, that the oxalate of ammonia, treated as above, for obtaining carbonic oxide, yields the same products as the binoxalate of potassa or oxalic acid, treated according to the methods described in the books.

Professor Mitchell states, that "on examining the residuary matter left in the retort, it is found to be strong sulphuric

acid." I must confess, I am at a loss to know in what way he made the examination, to arrive at such a conclusion, unless it be that he used more than "one or two drachms of sulphuric acid," for in each case in which I examined the residue, where an ounce of the oxalate and two drachms of acid were used, I found crystals in the retort, after the materials had cooled, answering in every respect to the acid sulphate of ammonia. If the quantity of sulphuric acid be increased to four or five drachms, and the heat be stopped a little before the gas ceases to come over, the acid will then hold the sulphate in solution and exhibit to the eye an appearance of sulphuric acid; but a single and very simple experiment—namely, the evaporation of a few drops of the liquid on a platinum or glass capsule, until a part of the acid is expelled, will indicate the presence of some salt, and that, on examination, will be found as above mentioned. That ammonia should escape from the retort, in a free state, while it is in contact with a large excess of free sulphuric acid, and then combine with the carbonic acid resulting from the decomposition of the oxalic acid, appears to me unphilosophical, and is disproved by experiment, for we recover the whole, or very nearly all the ammonia in combination with sulphuric acid.

*American Journal of Science and Arts.*

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ART. LXXII.—ANALYSIS OF COCCULUS INDICUS.

By M. M. PELLETIER AND COUERBE.

ACCORDING to these chemists, the substance of this fruit contains only one crystallizable principle, whilst its envelopes contain three new substances, one of which is neutral, and capable of regular crystallization, and one which also can be obtained in a crystalline form, and has an organic base.

*Analysis of the substance of the fruit.*—The products recognized in this were: 1. Picrotoxine. 2. A Resin. 3. Gum. 4. An acid fatty matter. 5. An odorous substance. 6. Ma-

lic Acid. 7. Mucus. 8. Starch. 9. Woody fibre. 10. Malate of lime. 11. Inorganic salts (nitrate of potassa, sulphate of potassa, chloride of potassium) *by incineration*, carbonates of potassa and lime, manganese, and iron.

The fruit was successively treated with ether, boiling alcohol, cold water, and boiling water. These menstrua were used in succession, and their action on the fruit continued until every thing soluble in them was taken up. The etherial solution afforded the picrotoxine, the fatty matter, and the yellow colouring principle.

*Analysis of the envelopes or shells.* These were reduced to powder, and exhausted by boiling alcohol, which on cooling, deposited wax.

The alcoholic extract, whilst in solution, gave it a brown colour; on evaporation it assumed an unctuous appearance, and had a sweetish bitter taste. Cold water took up from it a brown substance which was sensibly acid. It was next heated with slightly acidulated boiling water. The brownish fluid thus obtained gave abundant precipitates with the alkalis. That by ammonia was carefully collected, and designated as the *brown alkaline precipitate*. The alcoholic extract after this treatment, which had reduced it to a very small bulk, was treated with ether. The tincture thus made was mixed with a small quantity of water and distilled, to obtain the ether. The residuum consisted of a fluid on which a certain quantity of fatty substance was floating. The aqueous fluid had a marked smell and taste of myrrh, it was slightly milky. When evaporated to dryness it afforded an *acid, brown substance* having the appearance of a resin, and coloured in spots by chlorophylline; this substance they called menispermic acid.

*Menispermic acid.*—White, insoluble in boiling water, or in ether, soluble in the alkalis, precipitable from its solution by the mineral acids; uncrystallizable, presenting the appearance

of an amorphous mass which softens in boiling water. The mean of three analyses gave:

Carbon,	64.14
Hydrogen,	6.09
Oxygen,	29.17.

A composition differing very little from that of picrotoxine.

*Brown alkaline precipitate.*—Colour owing to a black matter, the greater part of which can be separated by water acidulated with weak acetic acid. This acid redissolves the precipitate with the exception of the black matter, and a little phosphate of lime. By a second precipitation by means of ammonia, the alkaloid principle is obtained in the form of a grayish yellow, resinous mass. Left in contact with water from which it had been precipitated it becomes pulverulent. Dried, redissolved in alcohol, and subjected to spontaneous evaporation, it affords three very distinct substances: 1. One having a green yellow colour, a resinous aspect, and of an alkaline nature. 2. The second crystallized in beautiful prismatic needles. 3. The third having the appearance of a fawn coloured mucilage.

The crystals of number 2, were found implanted in this last. The yellow matter, which was the most abundant, enveloped the whole mass. Those three substances were separated; the resin, by cold alcohol, the alkaline crystalline principle by ether, whilst the mucilaginous substance was taken up by absolute alcohol. When evaporated at 45° C. it was obtained in a crystalline form.

The first substance, which could not be deprived of colour or crystallized, was named the *yellow alkaline substance*. It appeared to bear the same relation to the crystallized alkaline principle, as those alkaline substances met with in the mother waters from which strychnine, quinine, morphine, &c. do to these principles. These resinous substances are soluble in acids, precipitable by alkalies, and can never be obtained in a crystallized state, nor in an alkaline nor neutral condition;



they differ from the alkalies peculiar to each vegetable, and are, perhaps, alterations of them. The discoverers gave the name of *menispermine*, to this substance, and that of *para-menispermine* to the second, as it presented a similar composition to the first, with which it is isomericous.

*Menispermine*.—White, opaque, crystallizing in four sided prisms, insipid, appearing to have no marked action on the animal economy; fusible at  $120^{\circ}$ , decomposed at a higher temperature, leaving a voluminous coal; insoluble in water, soluble in alcohol and ether, which on evaporation afford it in a crystalline form. The acids, when more or less diluted with water, dissolve it, from which solutions the alkalies precipitate it without alteration. Concentrated sulphuric acid appears to have but little action on menispermine, and does not strike it a red colour with it; when hot it dissolves it; the solution is precipitated by diluted ammonia. Concentrated nitric acid also has but little action on this substance when cold, when aided by heat, however, it converts it into a resinoid yellow matter, and into oxalic acid. The neutral sulphate of menispermine crystallizes in prismatic needles.

*Para-menispermine*. Solid, crystallized in four sided prisms having a rhombic base, generally grouped in small radiated masses, resembling stars; subliming without alteration, not sensibly soluble in water; somewhat so in ether, wholly so in absolute alcohol. The mineral acids at  $14^{\circ}$  C. have very little action on para-menispermine; when hot, they decompose it, when diluted with water they dissolve it, but do not become saturated.

*Composition*.—The plan followed in the examination was that of Gay-Lussac, the mean of these analyses gave:

Carbon,	71.80
Nitrogen,	9.57
Hydrogen,	8.01
Oxygen,	10.53

Which gives the following formula  $(C^9 N^1 H^1 O^1) \times 2$ . But by admitting two atoms of nitrogen in the alkaloid, to preserve the analogy between this and the other alkaloids, this atomic composition reduced to centimes, gives nearly the numbers found by experiment.

C <sup>18</sup>	=	13.75.884	=	72.31
N <sup>2</sup>	=	177.038	=	9.31
H <sup>24</sup>	=	149.760	=	7.87
O <sup>2</sup>	=	200.000	=	10.52

Here then are two substances having the same composition, which are endowed with very different physical and chemical properties; one is alkaline, saturates acids, and forms crystalline compounds, the other is not alkaline, does not saturate acids, and is volatile.

*Journ. de Chim. Med.*

ART. LXXIII.—OBSERVATIONS ON THE ACTION OF BROMINE on different vegetable alkaloids, as Quinine, Cinchonine, Morphine, Salicine, Strychnine &c., comparatively with that of Iodine on the same alkaloids.

By M. D. BLENGINI, of Turin.

BROMINE had scarcely been discovered, when chemists applied themselves to an investigation of its properties, as well as of its action on other bodies, both simple and compound. Although these investigations have developed many relations of this new body, I made some experiments to ascertain the influence it exerts on germination and vegetation. These experiments are recorded in the *Calendrier Georgique*, for 1833.

Although it is now well known that bromine, like iodine or chlorine, when brought in contact with a solution of potash and soda, gives rise to a decomposition of the water, and a formation of a hydro-bromate of potash and soda, the manner in which it acts on the vegetable alkaloids remains to be

ascertained. These alkaloids, although endowed with alkaline characters, are very different in their nature from potash and soda. These considerations induced me to investigate the action of bromine, on quinine, cinchonine, morphine, strychnine and salicine.

After having prepared a solution of quinine with diluted alcohol, I poured a few drops of bromine into it, the solution became turbid, and of a red colour, after a short reaction aided by heat, the colour disappeared, and a turbid and somewhat opaline solution was the result, which after standing afforded a somewhat coloured precipitate, soluble in alcohol.

The clear liquid, subjected to evaporation, gave rise, as it became concentrated, to a disengagement of white fumes, which quickly reddened litmus paper. The liquid was acid, bitter, reddened litmus paper, and became of a brown colour; on cooling, it deposited small crystals, of a form which it is difficult to describe. After having separated the mother water, and having again subjected it to evaporation, it again afforded white acid fumes, resembling hydro-bromic acid, the liquid residue became of an obscure colour, and on cooling gave rise to small crystals, still more complex than the preceding.

I dissolved the first crystals obtained in pure water, and treated the solution with nitrate of silver, a yellowish white precipitate was immediately formed, which when exposed to the light soon became brown, but not as much so as chloride of silver. The same solution, heated with liquid ammonia, gave a white precipitate, formed of quinine. Having introduced a portion of this same solution in a V shaped tube, and established a communication by means of two platina wires with the two poles of a voltaic pile, a liquid of a red colour manifested itself at the positive pole, and along the platina wire; there was no sensible disengagement of gas; this fluid, on examination, proved to be bromine; at the negative pole there was a disengagement of much hydrogen gas. The same solution heated with a little nitric acid, became of a brown red colour, and when heated gave out red fumes, having the smell of bromine.

The second crystals, heated like the first, presented the same results.

Cinchonine, morphine and strychnine, treated in the same manner, gave analogous results, with this difference only, that the crystals obtained by the reaction of the bromine with cinchonine were more distinct, assuming a needle like appearance. Moreover, the solution obtained in this case, gave out acid fumes, but they were of a red colour, without becoming brown, as was the case with quinine.

The saline matters obtained, treated with nitrate of silver, with pure ammonia, with nitric acid, and subjected to the action of the voltaic pile, acted exactly similar to those obtained with quinine and bromine.

Salicine also presented analogous phenomena, when acted on by bromine, but, during the evaporation of the solution and the disengagement of white, acid fumes, the porcelain capsule in which it was contained exhibited a circle of a beautiful red colour. On cooling, I obtained a saline substance, soluble for the most part in water, and its solution treated with nitrate of silver &c., and the voltaic pile exhibited the same phenomena as above.

After these experiments, I investigated the phenomena which the same vegetable alkaloids presented when acted on by a solution of iodine in very diluted alcohol. Scarcely was the solution of iodine poured on these alkaloids, when a very vivid red colour was manifested, and after a short reaction, aided by heat, the red colour disappeared, and I obtained a turbid and somewhat opaline solution, which, after standing afforded a dirty white precipitate.

After having concentrated the solution in a porcelain capsule, I obtained, on cooling, a white saline substance.

Strychnine and salicine afforded beautiful needle like crystals; quinine, cinchonine and morphine, gave much more confused crystals. The saline matters were separated from the mother water and dissolved in pure water. I treated these solutions as follows:



1st. Nitrate of silver gave me a dirty white precipitate, almost unalterable by light, and insoluble in ammonia.

2d. With nitric acid, these solutions became of a reddish white colour, and when heated, there was a disengagement of the violet fumes of iodine.

3d. On mixing these solutions with a solution of starch, I observed no change, but on the addition of a drop of nitric acid, there was an immediate precipitation of a blue ioduret of starch.

4th. Having introduced these solutions into a tube bent in the form of a V, and having subjected them to the action of a voltaic pile, I observed, as in the case of bromine, a red substance at the positive pole, without disengagement of gas; and at the negative pole, a disengagement of hydrogen with a precipitation of a whitish substance. I repeated the same experiment, in adding to the same solutions a solution of starch, and soon observed, both at the positive pole and along the wire, the beautiful blue colour of the ioduret of starch.

5th. In treating the solutions obtained by the reaction of iodine with quinine, cinchonine, morphine and strychnine, with pure liquid ammonia, I obtained precipitates of these bases of a pure white colour.

From these facts, I think that I may conclude:—

1st. That bromine, in acting on quinine, cinchonine, morphine, strychnine and salicine, with the aid of water, this latter is decomposed, and gives rise to a formation of a hydrobromate of those bases, without altering them, provided the action of the heat used be not too violent, or of too long duration.

2d. That this action of bromine on the vegetable alkaloids is analogous to that which it exercises on potash and soda; for it is likely, without, however, the fact being verified in the series of experiments I instituted, that besides a hydrobromate that there is also a formation of a bromate of these alkaloids.

3d. That iodine acts on these vegetable alkaloids in a manner analogous to bromine.

4th. Finally, knowing the action of bromine and iodine on these alkaloids, the hydro-bromates and hydro-iodates of these bases may be thus prepared.

*Journ. de Chim. Med.*

ART. LXXIV.—ON THE EXTRACT OF HELLEBORE OF BACHER.

By M. SOUBEIRAN.

M. M. HENRY and GUIBOUT published, some years since, some observations on Bacher's pills. After having compared the various formulæ proposed for this preparation, they gave the preference to the original recipe of Bacher, with some modifications. This preference, at least as regards the formula of the Codex, does not appear to me to be well founded, but as it has some specious arguments in its favour, it will be no doubt adopted by many, who, without further examination, will receive with confidence the opinion of these eminent pharmacutists.

I will first speak of the formula of Bacher, and that adopted by M. M. Henry and Guibourt, which scarcely differ from each other. These latter have fixed the dose of the vehicle in which it ought to be given. They have also suppressed the first affusion of boiling water, and the re-resolution of the extract in the water, manipulations recommended by Bacher, and which it would be as difficult for us, in the present state of our knowledge as respects the composition of hellebore, to point out the advantages as to demonstrate the inutility.

To enable our readers to follow the comparison more readily, between the modified formula of Bacher and that of the Codex, I will commence by giving each:

	Codex.	Bacher.
Black hellebore,	500 grammes,	500 grammes.
Carbonate of potash,	125    “	125    “
Brandy,	2000    “	1225    “
White wine,	2 litres,	6 litres.

It is seen that the principal elements, namely, the hellebore

and alkali are in the same quantities in both formulæ, and that the difference exists in the proportions of the vehicles. Whether the proportion of brandy be more or less, is doubtless of no moment, provided it is sufficient to exhaust the root, since none of it remains when the extract is made. But with the wine the case is different, as its fixed parts are added to the extracted mass and augment its weight, consequently diminishing in an equal ratio the proportions of the active principles furnished by the hellebore. This is very evident when we examine the following comparative results, obtained in operating by each of these plans. It may be useful to add, that the same root and the same wine were used in each case, as the quantity of the products might change by the employment of another root of hellebore, and a wine differently charged with tartar and colouring matter; but it is very evident that if the relation between the two extracts is found different, that the general result must be the same.

Five hundred grammes of the root of black hellebore, treated by the formulæ of Bacher and the Codex, gave:

Extract of the Codex,	264 grammes,
Henry and Guibourt,	346 do.

Not to lose the quantity of vinous fluid which remained in the marc, it was in each case displaced by water, and added to the solutions during their evaporation.

The great difference in the weights of these extracts evidently depends on the quantity of matter furnished by the wine. In fact, the formula of the Codex calls for two litres of wine, and that of Bacher for six. The wine used left 21 grammes of extract per litre on evaporation. The weight of the extract of hellebore was therefore augmented 42 grammes in the formula of the Codex, and 126 grammes in that of Bacher. Now, if we subtract these quantities from their respective extracts, we find

Formula of the Codex,	222 grammes of extract.
Henry and Guibourt,	220 do.

Hence it is evident that the difference between the two extracts is, in fact, owing to the proportion of foreign matters furnished by the wine to each.

One part of the extract of the Codex represents 1.89, or nearly two parts of the root, whilst the same quantity of extract by the method of Bacher only represents 1.44 parts of the root, or almost a quarter less. It therefore results, that the practitioner who administers one grain of the extract of the codex, employs the soluble portion of two parts of the root, whilst his patient will only take  $\frac{3}{4}$  of a grain, if the formula of Bacher modified by M. M. Henry and Guibourt be used in its preparation.

I am ignorant as to the motives that induced the authors of the codex to adopt the formula they prescribe. Perhaps they were wrong in changing the original formula of Bacher, for except from absolute necessity, old formulæ consecrated by usage, should not be altered; but now that the formula has been changed, and has come into general use, it is certainly not an improvement to recur to the ancient one.

The extract of Bacher, according to the formula of the codex, contains more of the alkaline carbonate, and might appear to be more deliquescent; that of M. M. Henry and Guibourt is less alkaline, but is not less deliquescent, as it contains more acetate of potash than the former.

*Journ. de Pharm.*

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ART. LXXV.—ON THE TRUE ORIGIN OF AMBER.

By GIUSEPPE ALESSI.

(Extract )

THE origin of amber has for a long time occupied the attention of naturalists, and of all who desire to investigate the secrets of nature, and who endeavour to ascertain the true source of her productions. Nevertheless, Klapproth and Wolf, and more particularly Ferrara, in his researches on Sicilian amber, confess that, to the shame of science, we still are far from having any positive information as to the formation of amber.



M. Alessi thinks he has ascertained this, and after giving the opinions of the ancients, goes on to say that, "In the centre of Sicily is found the ancient city of Enna, in Castro Giovanni, with its vast fertile plains, of which it forms the centre; not far distant from it is the ancient fief of Fico. Here is a high hill, covered with wood on its lower part; opposite this are other hills forming a kind of amphitheatre. The lower portions are sandy, but after ascending a short distance, clay mixed with calcareous substances, sand and vegetable soil, occurs. On its surface, and to some depth, are found a heterogeneous mixture, of pieces of alabaster, gypsum, slate, iron pyrites, ferruginous clay, some vitreous lava, and also fragments of amber. Clay slate also occurs but at a greater depth. At about four hundred paces from the hill, flows a branch of the Moselle, a river which arising among the higher grounds falls into the Salso. It is evident that the formation just spoken of, owes its origin to some recent causes."

In the sandy soil at the base of the hill, is a stratum of sandstone, which is not very compact, covered with an abundant efflorescence of hydro-chlorate of soda, and just below this is a rivulet, the water of which is impregnated with soda and sulphur. Its colour is whitish, its odour is disagreeable and its taste salt.

"There," continues the author, "my brother Antonio thought he discovered a mine of salt and sulphur; he penetrated through the mass of rock, and at twenty feet horizontally, he found in a formation of clay mixed with sulphur and some fragments of sulphuret of iron, a sort of fossil tree, which was broken in raising it. Some pieces of both the trunk and the branches were collected, these presented a translucent, odoriferous gum, resembling amber; we also collected some fine powder and fragments of bitumen from other parts of the tree, for the purpose of comparison and analysis."

Some broken branches of five or six inches in diameter were split in various directions, and had more the appearance of peat than of lignite. They all resembled an extinguished coal. Others presented the fibrous part covered with clay,

and in the longitudinal fissures was a slight efflorescence of sulphur, sensible both to the sight and the taste. Two other and more compact fragments were formed of concentric, cracked layers, which, when detached, brought in view a sort of resin, which had evidently exuded from the wood, in the form of mammillary drops or stalactites; they were more or less yellow or red, as was the powder spoken of above.

M. Alessi, after having recognized all the external physical characters of amber in this product, namely: a clear, or lemon yellow colour, sometimes verging on orange, an odour analogous to that of the resin of the pine, and also the peculiar bituminous smell of amber, which was predominant, subjected it to analysis.

Compared with the amber of commerce, that of Fico possessed all the proper characteristics. It only differed in its specific gravity, which was 0.009 whilst that of commerce is 1.078.

The new amber gave unequivocal evidences of its electric properties, attracting straws, &c.; when exposed to a flame it burnt in the same manner as its congener, exhaling a penetrating but agreeable odour.

When reduced to powder and digested in alcohol, it afforded a tincture which had all the properties of that of amber, as the colour, the peculiar smell, and the somewhat astringent taste. By means of a gentle heat it was soluble in the volatile oils of lavender and turpentine, and in the fixed oils, as boiled linseed, the amber of commerce required a higher degree of heat to be acted on by these substances. Finally, the amber of Fico, introduced into a retort, and heat applied, swelled and melted, filling the apparatus with white fumes. When these disappeared, the arch and neck of the retort were found lined with globules of water, traversed by striæ of a brownish oil, and small silky crystals scarcely visible to the naked eye, but readily perceptible with a microscope. When the apparatus was taken apart, there was a strong smell of oil of amber. A little distilled water introduced into the vessel to wash off what adhered to the sides, assumed the colour

and odour of oil of amber. It reddened litmus paper. The residue was diaphanous, brown, friable, of a vitreous aspect, and dissolved in the oils above mentioned. When burnt, it furnished a brittle charcoal, which afforded reddish ashes. This latter changed vegetable blues to green; the hydrocyanate of potash showed the presence of iron, and the oxalate of ammonia demonstrated that of the salts of lime, whilst the hydro-chlorate of platina gave proof of traces of potash.

Returning to the nature of amber, the author gives it as his opinion, that amber is not merely a vegetable production as was stated by Pliny, but this exudation must also be mineralized; undergoing the action of causes unknown to us, it is gradually changed into amber.

As to the species of tree to which it owes its origin, the author is unable to determine. Pliny has attributed it to one of the pines. Geronimo Recupero, who made many researches on this subject, found three larvæ of the phalena of the pine in a fragment of amber. He also possessed another fragment containing a small branch of pine which had borne flowers. This confirms the observations of chemists, cited by Martius, that they had obtained a substance resembling yellow amber, from the resin of the fir. Now, the powder found by M. Alessi still retained the odour of resin, an odour not possessed by amber, as it has probably been dissipated, and the author states that this was the case with the amber of Fico. Pliny has said of amber *pineus in atritie odor*. When the wood from which the amber had transuded was burnt, it had the smell and flame of pine. The structure, bark, the resin attached to it all had a close resemblance to the branches of the *Pinus sylvestris*, a native of Sicily, where they are used by the inhabitants for torches, under the Latin name of *tæda*. Although the *P. sylvestris* affords but little resin, the *P. abies* furnishes a great quantity of the fluid turpentine which might be mineralized. This would explain the origin of the large pieces of amber which are sometimes found, and contain various species of insects.

To conclude, M. Alessi thinks that it is evident, that amber owes its origin to a species of pine or analogous tree, and

that this resin exudes or distils from its bark. He supposes that united to, or detached from the wood, it might be mineralized ; as it is often found with lignite, and almost always between what was the bark and *liber*. Fluid in the first instance, it gradually became concrete, hence the foreign substances found in it.

*Journ. de Pharm.*

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ART. LXXVI.—ON KERMES MINERAL.

By JUSTUS LIEBIG.

M. LIEBIG has just published a long memoir on the kermes mineral. The results he has obtained are the following :

The officinal kermes is not formed or deposited from solutions, except these contain oxide of antimony, or where the oxide is formed at the expense of alkaline oxides.

Solutions not containing this oxide, afford, it is true, in certain cases, precipitates, which at first view bear some resemblance to the kermes mineral ; but a more attentive examination soon shows that they are dissimilar in composition and in their properties.

All these pretended kermes are identical with the precipitates obtained, by adding, at the ordinary temperature, alkaline carbonates to alkaline solutions of the sulphuret of antimony, with alkaline oxisulphurets, which are not decomposed by simple washing with water. There is then no other sulphuret of antimony, by the humid way, than the hydrated precipitate obtained by decomposing the solutions of the salts of antimony by sulphuretted hydrogen ; prepared in any other manner, it always contains the oxide, or else a metallic sulphuret which replaces this. The last combinations



which contain an alkaline oxisulphuret, are distinguished by the property of completely dissolving in a solution of potash, whilst they are still moist, and of then giving rise, by the addition of an acid, to a disengagement of sulphuretted hydrogen, and to sulphuret of antimony, which is precipitated. The production of sulphuretted hydrogen is due in this case, to the decomposition of the alkaline oxisulphuret. The combinations of sulphuret of antimony containing the oxide, the true kermes mineral, for example, are not completely soluble whilst moist, in caustic potash, but they leave for residue, a pulverulent yellow combination of potash and sulphuret of antimony, with the oxide of the same metal, a combination which is insoluble in water, and represents the crocus of the ancients.

Hoping from the facts announced in his memoir, that he has settled the nature and composition of kermes mineral, M. Liebig has endeavoured to find a plan by which a product of identical composition can always be obtained. He proposes the following, as giving a beautiful article, of a bright flame colour, which dries readily, and then assumes the appearance of a fine crystalline powder.

Four parts of pulverized sulphuret of antimony, are to be mixed with one part of dry carbonate of soda, and melted at a red heat, till the mass is perfectly fused. Care must be taken not to use an iron instrument to stir it with. The fused mass is poured on a tile; it is readily broken after it is cool, and can be reduced to a very fine powder. One part of this mass finely pulverized, is to be boiled for one hour with two parts of crystallized carbonate of soda, in sixteen parts of water, the whole filtered and cooled. The kermes is precipitated in the form of a heavy powder. The mother waters are to be decanted, and again boiled with the residue. These operations are to be several times repeated, till nothing remains but a yellow or brown crocus, at each cooling a corresponding quantity of kermes will be obtained.

M. Liebig also observes, that the kermes should not be washed with warm water, as this decomposes it, and as it

acts more on the oxide of antimony than on the sulphuret, which it dissolves, if this practice be followed, a kermes will be obtained deficient in oxide. M. M. Geiger and Hesse, have also observed that if recently prepared kermes be boiled for a length of time in a large proportion of water, and not exposed to the action of the air, it is completely decomposed into sulphuretted hydrogen which is disengaged, and into oxide of antimony, which remains in solution in the water, and that the kermes, sprinkled with water and exposed to the action of the air, completely disappears after a certain time, leaving nothing but some whitish flakes.

*Journ. de Pharm.*

## Miscellany.

*Syrup of Coffee.*—M. Ferrari gives the following formula for this preparation :

Moka coffee, roasted,	℥iv.
Water,	lbij.
Refined Sugar,	lbiiij.

Infuse the coffee in a pound and a half of cold water for six hours, in a close vessel, place the vessel in a water bath, giving vent to the steam; when heated to boiling, remove the vessel, and let it stand to settle; then decant, and add the remainder of the water. After standing for some hours, decant and gradually add the sugar, dissolve it by means of a water bath, and strain. The dose is one ounce, or even more.

*Journ. de Chim. Med.*

*Homogeneous light of great intensity.*—Mr. H. F. Talbot states that this important desideratum for many important optical experiments, can be thus obtained. It is only requisite to place a lump of common salt upon the wick of a spirit lamp, and to direct a stream of oxygen gas from a blow pipe upon the salt. The light emitted is quite homogeneous, and of a dazzling brightness. If, instead of common salt, the various salts of strontian, barytes &c., be used, the well known coloured flames, characteristic of those substances will be procured.

*Lond. and Ed. Phil. Mag.*

*Hydrographic Paper.*—M. Chevallier has examined a paper lately invented, which may be written on with a pen dipped in pure water. He found that it was prepared by soaking the sheets of paper in a solution of sulphate of iron, drying them, and then covering them with finely powdered galls. He states that similar papers may be prepared by using other solutions and powders; thus blue is probably prepared by powdering the paper, soaked in sulphate of iron, with ferrocyanate of potash.

*Journ. de Chim. Med.*

*Codeine.*—Dr. Barbier, of Amiens, is of opinion, from experiments made with it, that codeine enjoys very remarkable medical properties, compared with the other products of opium, and even opium itself. Administered in solution or syrup, in the dose of a spoonful or half an

ounce, containing a grain of this substance, codeine acts promptly on the ganglionic nerves, and on the apparatus of innervation; it has little action on the cerebrum, and makes no impression on the spinal marrow or nervous plexus of the great sympathetic nerve; it is efficacious in gastralgia, and procures a sleep remarkable for its placidity and the calm state that succeeds to it.

It relieves unpleasant feelings in the epigastrium, and far from producing constipation, like other preparations of opium, it rather keeps the bowels in a soluble condition.

Dr. Barbier considers codeine—

1st. As a precious acquisition to the materia medica.

2d. That its action is principally exercised on the nervous plexus of the ganglionic nerves.

3d. That it induces a placid sleep.

4th. That it is efficacious in abdominal neuroses.

5th. That it does not alleviate neuralgic pains.

6th. That it does not derange the digestive functions, and appears to open the bowels rather than to constipate them. *Journ. de Pharm.*

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*Solanine in the germs of Potatoes.*—Dr. Julius Otto states that fatal results having been observed to follow the feeding of cattle on the residue of germinated potatoes, used for the manufacture of brandy, he was induced to examine this article. From his experiments, it results, that solanine exists in the germs of the potatoe, and which can readily be separated by treating the germs with water, acidulated with sulphuric acid, precipitating with acetate of lead to separate the sulphuric and phosphoric acids, as well as an extractive matter. The liquid being filtered, and saturated with lime water, affords a precipitate from which solanine can be separated by boiling alcohol.

From experiments made with this solanine, it appears, that the sulphate, in doses of a grain, will destroy rabbits in six hours; that in larger animals it requires three grains, and death does not take place until the expiration of nine hours. It was particularly remarked, that the action of this salt was manifested by a paralysis of the posterior extremities.

*Journ. de Chim. Med.*

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*Easy mode of separating the Copper contained in Cajeput Oil.*—M. F. Schosufel, of Magdeburg, has described the following mode of separating the copper which is usually in solution in cajeput oil:—A mixture of the green cajeput oil of commerce, and a solution of caustic potash, is to be made and well shaken, heated moderately and filtered. The hydrated oxide of copper, which is formed, will remain on the filter, and the liquid will pass in almost a clear state; the oil is to be separated from the caustic ley, and several times washed with distilled water. *Ibid.*



*Artificial Cajeput Oil.*—M. Mortier has made the following experiments on this subject:—Forty grains of camphor, dissolved in two drachms of concentrated acetic acid, were added to a mixture of four drachms of essence of rosemary and two ounces of distilled vinegar; the whole was subjected to distillation in a copper alembic, with half an ounce of bruised cardamoms and sixteen ounces of water. The oil which resulted having no action on copper was not coloured. An alcoholic tincture of milfoil (*ACHILLEA millefolium*,) gave it, however, a beautiful and permanent green tinge. In two days the oil was clear. The usual mode of ascertaining whether oil of cajeput is genuine, is to drop a small quantity of it on sugar, and to dissolve this in water; if artificial, the camphor will separate. M. Mortier, however, states that if the camphor is intimately united with the oil by repeated distillations, this test fails.

The existence of the green colour depends on many circumstances. Thus, for example, wormwood sometimes furnishes a green, and sometimes a brownish oil. Essence of peppermint prepared from the recently dried leaves is yellowish. If, however, the leaves be permitted to heat, even for a single night, the oil obtained will be of a brown colour.

*Journ. de Chim. Med.*

*Hyperiodic Acid.*—M. M. Ammermuller and Magnus state that it is impossible to obtain this acid by the method given by Serullas for procuring the hyperchloric acid, for on heating the iodate of potash, the result is only a hyperiodate. When chlorine gas is passed into a solution of iodate of soda, with excess of base, and a gentle heat applied, there is a precipitation of a white, insoluble, crystalline powder, which is the hyperiodate of soda. The temperature not permitting an extrication of all the oxygen of the salt, these chemists had recourse to a hyperiodate of silver, to determine the composition of the hyperiodic acid. This salt is obtained in the form of a bright yellow precipitate, as when a solution of hyperiodate of soda, in weak nitric acid, is decomposed by nitrate of silver. By evaporating the solution of this precipitate in nitric acid, it gives rise to crystals of an orange yellow colour.

The formula of this salt is  $\ddot{\text{I}} \text{Ag}$ . or,

Iodine,	42.313
Silver,	36.237
Oxygen,	21.448

It is a neutral and an hydrous hyperiodate of silver. This neutral salt is decomposed by pure water into an insoluble basic salt and hyperiodic acid. This is the best method of obtaining this acid in a state of purity, which, like hyperchloric acid contains seven atoms of oxygen to a double atom of chlorine or iodine. The solution of hyperiodic acid may be boiled without alteration; and on evaporation, furnishes the acid in a crystalline state; this acid forms crystallizable basic salts.

*Journ. de Pharm.*

*Influence of temperature of Ioduret of Starch.*—M. Laissaigne observes that ioduret of starch, obtained by cautiously pouring an alcoholic or aqueous solution of iodine in a solution of amidine, prepared by treating fecula rubbed down in cold water, is not only remarkable for its beautiful indigo blue colour, but also for its peculiar character of losing its colour at 89 or 90° R., and of regaining it again on cooling. This phenomenon may be several times reproduced with the same solution, if care be taken not to pass the point at which the loss of colour is complete; for by boiling the solution for a minute to a minute and a half, it loses its property of regaining its colour on cooling. The iodine, in acting on a part of the amidine, is transformed into hydriodic acid, and we may, by cautiously adding a weak solution of chlorine, cause a regeneration of the blue colour of the ioduret, which is again formed by the iodine thus set at liberty.

The point of decolouration of the ioduret of amidine, appears subordinate to the density of the liquid. In fact, a concentrated solution which loses its colour at +89 R., when diluted with an equal bulk of water, becomes colourless at 77 R.; and if the proportion of water be increased, at even a lower temperature. Amidine made from wheat starch, forms a combination with iodine, which is remarkable for its beautiful violet colour; this seems to establish a difference between this product and that from potatoe starch. The action of acids on these two iodurets, also denotes a difference between them.

*Journ. de Pharm.*

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*Purification of Carbonate of Soda.*—M. Gay Lussac recommends the following method for obtaining a pure carbonate of soda. Take the crystals of carbonate of soda, such as are met with in shops; having washed them, make a saturated hot solution, when this is set to cool, stir constantly with a rod or spatula, to obtain small crystals; this cooling may be accelerated by placing the vessel containing the saline solution in cold water. It sometimes happens, that when very much cooled the solution does not crystallize on becoming solidified. This is the moment to stir very rapidly, to prevent the conglomeration of the crystals. This delay in the crystallization may be prevented by throwing a few crystals into the solution at the moment when it begins to become supersaturated. Having obtained the crystals, put them into a funnel, in the neck of which place a little tow or cotton to retain them. At first let them drain, then wash with small quantities of distilled water, waiting till the preceding washing has run through. Test from time to time, the washings with nitrate of silver, having previously saturated them with pure nitric acid; the purification of the salt is complete when the liquid remains transparent. By this process, and in the first operation, the greater part of the carbonate of soda may be obtained in a perfectly pure state. The mother liquid, and the washings may be evaporated and treated in the

same manner. The same mode of purifying may be used with advantage for many other salts. Its efficacy is founded upon the extreme facility with which water runs through and washes sandlike crystals.

*Philos. Mag.*

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*Honey of Trebizond.*—Mr. K. E. Abbott, in a letter read before the Zoological society of London, gave some account of the famous honey of Trebizond, spoken of by Xenophon in his history of the retreat of the ten thousand Greeks, as having produced the effect of temporary madness, or rather drunkenness on all who ate of it, without, however, causing any serious consequences. It is supposed to be from the flowers of the *Azalea Pontica* that the bees extract this honey, that plant growing in abundance in this part of the country, and its blossoms emitting the most exquisite odour. The effect which it has on those who eat it is as Mr. Abbott has witnessed, precisely that which Xenophon describes; when taken in a small quantity it causes violent head ache and vomiting, and the unhappy individual who has swallowed it, resembles as much as possible a tipsy man; a large dose will completely deprive him of all sense and power of moving for some hours afterwards. *Ibid.*

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*Juniper Berries.*—The fruit of the juniper is not a true berry, but a small cone, composed of three scales, forming a pulpy envelope, and containing triangular or quadrangular, hard seeds. These seeds are marked with a multitude of small cavities, each of which contains a small spiral tube. In the green seeds, these tubes are filled with essential oil, but in the mature fruit they contain turpentine and resin; hence the unripe fruit contains more essential oil than the ripe, and still more than the dried article of the shops. *Journ. de Chim. Med.*

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*Valerianic Acid.*—M. Trommsdorf has satisfied himself that the acid discovered by Pentz in the Valerian, and which he considered as the acetic, is a new acid, having the following properties. It is a colourless, limpid, and oleaginous liquid; its smell has much analogy to that of the Valerian root, but is more disagreeable, it diminishes when the acid is combined with a base, but never entirely disappears. Its taste is very acid and repugnant; the peculiar sensations it occasions on the gustatory organs persisting for a length of time. When very much diluted it leaves a sweetish taste. The density of this oleaginous acid at 26" 6<sup>m</sup> of pressure, and at 10° C. is 0.944. It remains liquid at 21; it burns without residue, affording a vivid flame; it boils at 132° under a pressure of 27" 6<sup>m</sup>; it is soluble in 30 parts of water at 12° C. Alcohol dissolves it in all proportions. Essence of turpentine and olive oil do not appear to dissolve it. Concentrated acetic acid of 1.07 dissolves it rapidly, and in large proportions. Sulphuric acid, when cold, gives it a yellow colour, and when hot

chars it, disengaging sulphuric acid. It may be prepared by agitating the essential oil of valerian with carbonate of magnesia and water, and distilling, an oil passes over which is not acid, and whose smell is less powerful than the original oil. Sulphuric acid is to be added to the fluid in the retort, and the mixture redistilled. *Annal. de Chim.*

*Protoxide of Copper.*—A very economical method of preparing this article is given by M. Malaguti: 100 parts of sulphate of copper are to be melted at a moderate heat, with 57 parts of crystallized carbonate of soda, and the action of heat continued till the mass becomes solid, this is then to be pulverised, and well mixed with 25 parts of copper filings, and the mixture put into a crucible and subjected to a white heat for twenty minutes. The mass when cool is to be pulverized and washed: the residue will be protoxide of copper, of a beautiful red colour. *Ibid.*

*Butter of Cacao.*—M. Boutin has discovered a peculiar, crystallizable neutral principle in this article, by treating it with alcohol. It is saponifiable, and with the alkalies gives rise to a very remarkable new fatty acid. *Journ. de Pharm.*

*Test for Iodine.*—Mr. A. Thomson has found that very minute proportions of iodine may be detected by the following method. This is founded on the property possessed by chlorine gas of instantly decomposing solutions of hydriodic acid, and the hydriodates; when this gas comes in contact with the surface of the solution, the most minute particle of iodine becomes apparent. If the solution contains only  $\frac{1}{1500}$  of hydriodate, the decomposition is instantaneous, and the free iodine appears. The moment the gas touches the surface, a slight brown pellicle is formed. If a very diluted and cold solution of starch be now added, the characteristic colour of the ioduret of starch is manifested. *Ibid.*

*Bignonia Catalpa.*—We find in the *Observatore Medico* that M. Automarchi, following the example of Kämpfer and Tauberg, has administered the seeds of this plant in asthma with satisfactory results. The mode in which he gave it, was to make a decoction of three or four of the beans in twelve ounces of water, to be boiled away one half; this dose is to be given morning and night.

These seed vessels have been analyzed by M. Grossot, with the following results. 1st. Ten parts in the hundred of a bitter like substance. 2d. Free malic acid. 3d. Malate of lime. 4th. An uncrystallizable saccharine matter. The bitter like substance is granular; its colour is reddish brown; its taste is analogous to that of butter of cacao; its smell is peculiar; it is insoluble in water, and in anhydrous alcohol; wholly soluble in potash, when heated it melts, giving out a fetid, animalized smell. *Journ. de Chim. Med.*



*Dry Extract of Asparagus.*—This is prepared by placing the filtered juice of asparagus shoots on porcelain plates, heated by steam, and evaporating to dryness; when fully dried it may be removed in the form of small scales of a beautiful brownish yellow colour, resembling the dry extract of cinchona. This extract attracting the humidity of the air, must be preserved in dry and well stopped bottles. One hundred grammes of juice which was prepared by M. Boullay, gave ten grammes of dry extract. *Ibid.*

*Creosote Ointment.*—This preparation has been recommended in obstinate cutaneous affections.

It is formed of axunge  $\overline{3}$ i.  
creosote  $\overline{3}$ i.

To be well incorporated in a porcelain mortar.

*Ibid.*

*Hemlock Plaster.*—This plaster has undergone numerous modifications in its preparation. M. Duclou has proposed another, which consists in adding to the melted mixture of resins and gum resins, a certain quantity of extract of conium prepared with the dried plant and alcohol. In admitting with the author the neatness of this mode of operating, it remains to ascertain whether the preparation is equal in its medical effects, to those made with the fresh plant; more especially as the active principle (conicine) is readily decomposable, during the drying of the plant, and the action of the heat employed in the preparation of the alcoholic extract.

*Journ. de Pharm.*

*Syrup of Orgeat.*—M. Blondeau recommends the following formula as affording an excellent article.

Sweet almonds lb.vj.  
Bitter do. lb.ij.  
Gum Arabic lb.j.  
Sugar lb.xx.  
Honey  $\overline{3}$ vj.  
Orange flower water  $\overline{3}$ viiij.

*Ibid.*

*Empyreumatic Oil of Chabert.*—This oil which has obtained much celebrity in the removal of tapeworms is made by mixing

Volatile oil of hartshorn  $\overline{3}$ iv.  
Essence of turpentine  $\overline{3}$ xij.

Digest for four days and distil till twelve ounces are obtained. The dose is thirty drops morning and evening.

*Journ. de Pharm.*

*Borate of Magnesia.*—Mr. Wohler observes that it is known that borate of soda produces no precipitate in a solution of sulphate of magnesia, but

if a mixture of these solutions be heated, an abundant white precipitate is formed, which as the liquid cools is slowly but completely redissolved. A similar solution in which the precipitate had disappeared remained for several winter months at a temperature below the freezing point. During this time there was a deposit of beautiful radiated groups of acicular crystals on the sides of the vessel, which closely resembled those of meototype. These crystals, insoluble either in hot or cold water, were pure borate of magnesia or boracite, with 16 atoms of water of crystallization or  $\dot{\text{M}} \text{ g } \ddot{\text{B}}^{\text{a}} + 16 \text{ H.}$

At a later period another salt appeared in large, transparent crystals, this was a double borate of magnesia and soda. This salt, completely soluble in cold water, presented an alkaline reaction, and was not precipitated by ammonia. Its solution possesses the characteristic property of becoming turbid when it is heated, and of depositing an abundant white precipitate, which, as the fluid cools, is entirely redissolved. It is therefore to the formation of this salt in a mixture of solutions of sulphate of magnesia and of borax, that the turbidness occasioned by the application of heat, must be attributed, this begins to manifest itself at about 70° R. This precipitation caused by heat in the solution of the double salt, arises from the change that takes place, into a basic borate of magnesia, borate of soda, and free boric acid.

The hydrate of magnesia, digested with a solution of borax, is dissolved in large proportions, and gives rise to the above mentioned double salt.

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*Hydrocyanic ether.*—M. Pelouze has lately discovered a new ether which he calls hydrocyanic, while examining the effects produced by heat on a mixture of the sulphovinate of barytes with cyanuret of potassium. This ether is liquid, colourless, possesses a very pungent alliaceous odour, and acts energetically on the animal economy. It is inflammable, boils at 82° R., under atmospheric pressure, its density is 0.787, at a temperature of 15° R., it is but little soluble in water, but perfectly so in alcohol or sulphuric ether. It does not precipitate the nitrate of silver, and in this respect resembles hydrochloric ether, which does not decompose the salt until it has been destroyed by the action of heat. M. Pelouze regards this ether as composed of equal volumes of olefiant gas, and of the vapour of hydrocyanic acid, compressed one half.

*Gazette des Hopitaux and Amer. Journ. Med. Science.*



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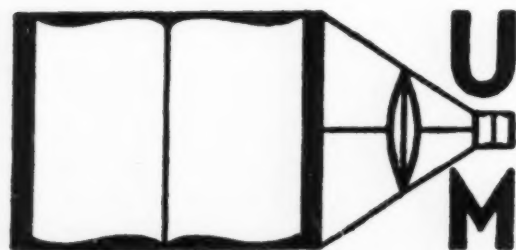
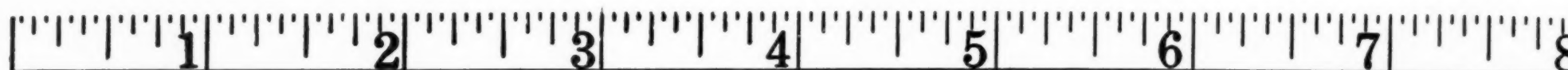
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